

1a Distances

1 Circle the **largest** number in each pair.

- | | | | | | |
|---|-------|-------|---|-------|-------|
| a | 8766 | 7668 | f | 89327 | 89321 |
| b | 5297 | 5440 | g | 5565 | 55645 |
| c | 1108 | 1123 | h | 31054 | 32045 |
| d | 20267 | 3875 | i | 73829 | 59298 |
| e | 9140 | 39041 | j | 10032 | 10320 |

2 Put these numbers in order from **smallest** to **largest**.

- | | | | | |
|---|-------|-------|-------|-------|
| a | 46510 | 50912 | 87338 | 24647 |
| | 24647 | 46510 | 50912 | 87338 |
| b | 91177 | 66819 | 92177 | 60888 |
| | 60888 | 66819 | 91177 | 92177 |
| c | 35409 | 35040 | 35134 | 34505 |
| | 34505 | 35040 | 35134 | 35409 |
| d | 61279 | 71868 | 78167 | 71964 |
| | 61279 | 71868 | 71964 | 78167 |
| e | 22839 | 22938 | 22309 | 22902 |
| | 22309 | 22839 | 22902 | 22938 |
| f | 48592 | 48504 | 48049 | 48599 |
| | 48049 | 48504 | 48592 | 48599 |



Complete the table so that these numbers are in order.

428 901

428 753

428 060

430 189

429 998

smallest	428 050
	428 060
	428 753
	428 901
	429 998
	430 189
largest	431 005

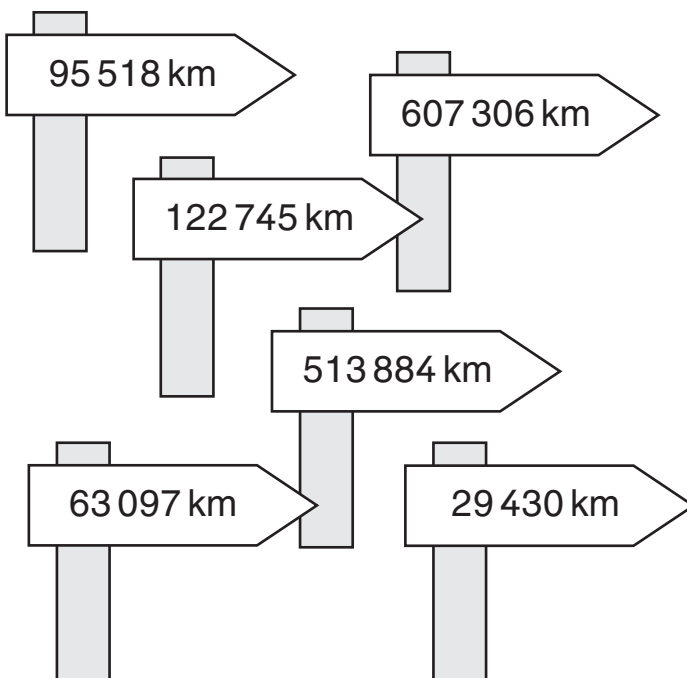


Round these numbers to the nearest 10 and the nearest 100.

	Nearest 10	Nearest 100
3047	3050	3000
2963	2960	3000
71 006	71 010	71 000
29 445	29 450	29 400
602 639	602 640	602 600
240 175	240 180	240 200



These distances need sorting. Write them in the table in order from **shortest** to **longest**.

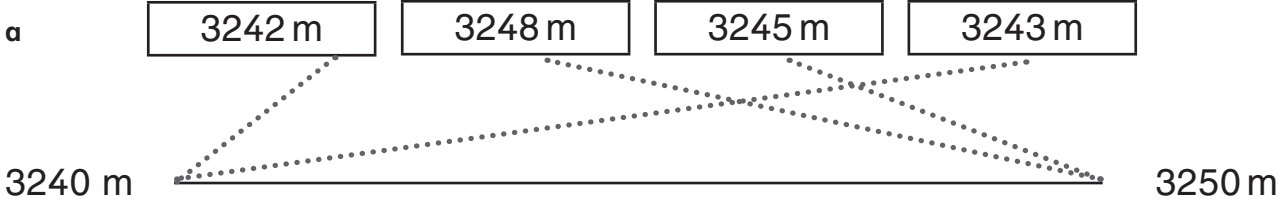


shortest	29 430 km
	63 097 km
	95 518 km
	122 745 km
	513 884 km
longest	607 306 km



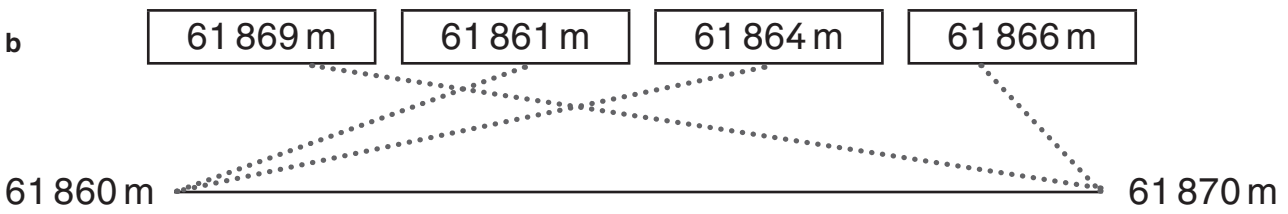
Round each length to the nearest 10 m.

Join them to the correct length on the number line. Some have been done for you.



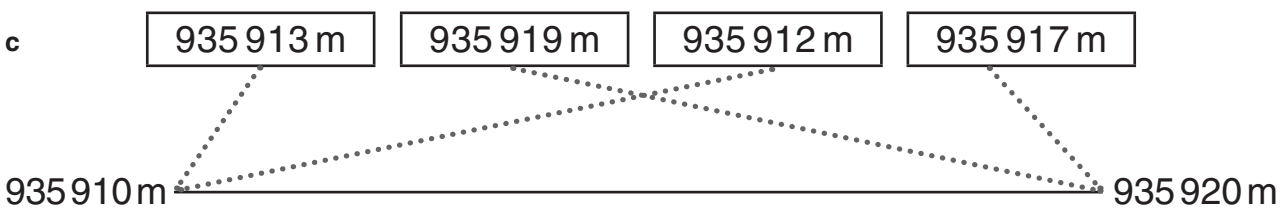
Now write the lengths in order.

$$3240 \text{ m} > \boxed{3242 \text{ m}} > \boxed{3243 \text{ m}} > \boxed{3245 \text{ m}} > \boxed{3248 \text{ m}} > 3250 \text{ m}$$



Now write the lengths in order.

$$61860 \text{ m} > \boxed{61861 \text{ m}} > \boxed{61864 \text{ m}} > \boxed{61866 \text{ m}} > \boxed{61869 \text{ m}} > 61870 \text{ m}$$



Now write the lengths in order.

$$935910 \text{ m} > \boxed{935912 \text{ m}} > \boxed{935913 \text{ m}} > \boxed{935917 \text{ m}} > \boxed{935919 \text{ m}} > 935920 \text{ m}$$



Investigate the lengths of the some of the longest rivers in the world.

Complete this table to show your findings. Put the rivers in order, starting with the **longest**.

Name of river	Country	Length (km)	Length to the nearest 100 km
River Nile	Egypt	6695 km	6700 km

1b Converting units of measure**1**

Answer these.

a $1.46 \times 10 = 14.6$

e $8470 \times 100 = 847\,000$

b $14.6 \times 10 = 146$

f $847 \times 100 = 84\,700$

c $146 \times 10 = 1460$

g $84.7 \times 100 = 8470$

d $1460 \times 10 = 14\,600$

h $8.47 \times 100 = 847$

Talk to your partner about what you notice.

2

Write 10 or 100 in the boxes to make each of these correct.

a $460 \div 10 = 46$

e $7810 \div 10 = 781$

b $4600 \div 100 = 46$

f $78\,100 \div 100 = 781$

c $46 \div 10 = 4.6$

g $781 \div 10 = 78.1$

d $460 \div 100 = 4.6$

h $7810 \div 100 = 78.1$

Talk to your partner about what you notice.

3

Convert these metres to centimetres.

a $375 \text{ m} = 37\,500 \text{ cm}$

e $20.2 \text{ m} = 2\,020 \text{ cm}$

b $83 \text{ m} = 8\,300 \text{ cm}$

f $4.15 \text{ m} = 415 \text{ cm}$

c $6.9 \text{ m} = 690 \text{ cm}$

g $7.06 \text{ m} = 706 \text{ cm}$

d $16.8 \text{ m} = 1\,680 \text{ cm}$

h $9.24 \text{ m} = 924 \text{ cm}$



Convert these kilometres to metres.

a 57 km m

e 18.22 km m

b 6.8 km m

f 20.99 km m

c 13.3 km m

g 3.006 km m

d 9.47 km m

h 4.185 km m



This chart shows the lengths of some of the longest bridges in the world. Complete the column showing the lengths in kilometres.

Bridge name	Length (m)	Length (km)	Country
Danyang–Kunshan Grand Bridge	164 800	164.8	China
Tianjin Grand Bridge	113 700	113.7	China
Weinan Weihe Grand Bridge	79 732	79.732	China
Bang Na Expressway	54 000	54	Thailand
Beijing Grand Bridge	48 153	48.153	China
Lake Pontchartrain Causeway	38 442	38.442	USA
Manchac Swamp bridge	36 710	36.71	USA
Yangcun Bridge	35 812	35.812	China
Hangzhou Bay Bridge	35 673	35.673	China
Runyang Bridge	35 660	35.66	China



Convert these minutes to seconds.

a 4 min s

d $3\frac{1}{2}$ min s

b 9 min s

e $2\frac{1}{2}$ min s

c 10 min s

f $5\frac{1}{2}$ min s

7

Convert these to minutes.

a 11 hours min

d 5 hours 10 minutes min

b 20 hours min

e 2 hours 48 minutes min

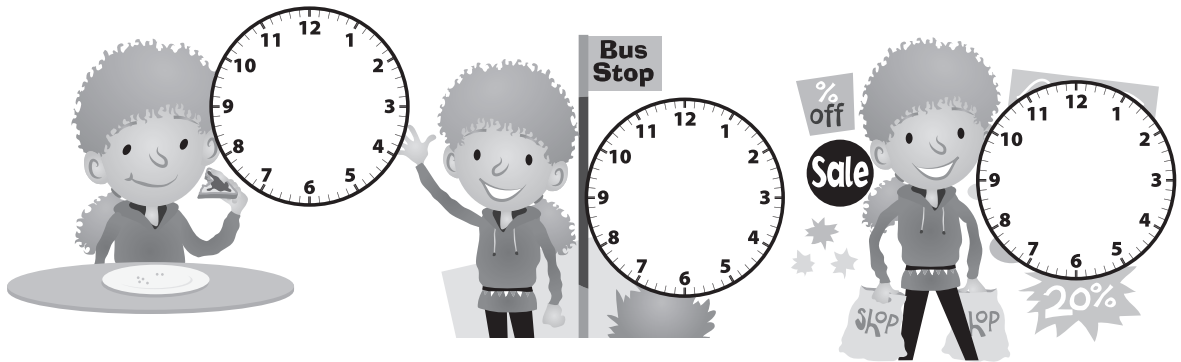
c $6\frac{1}{2}$ hours min

f 7 hours 25 minutes min

8

Zara has a busy Saturday.

Make up your own time for each activity. Draw the hands on the clock. How many hours and minutes are there between each time? *Check times are accurate and intervals are correct.*



hours min

hours min



hours min

hours min



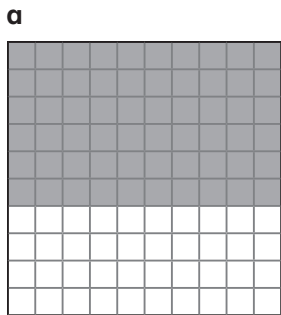
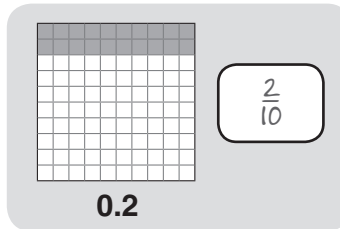
hours min

hours min

1c Fraction and decimal equivalences

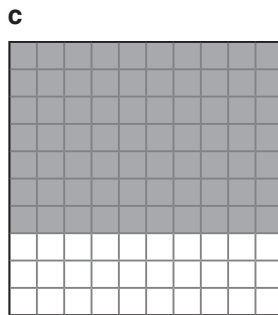


Colour the grids to show these decimals.
Write them as fractions in the box.



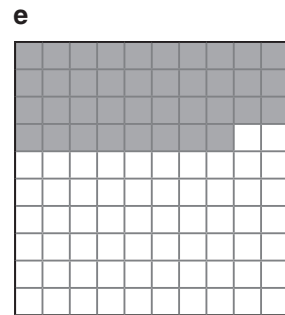
$$\frac{6}{10}$$

0.6



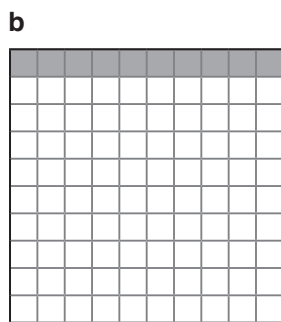
$$\frac{7}{10}$$

0.7



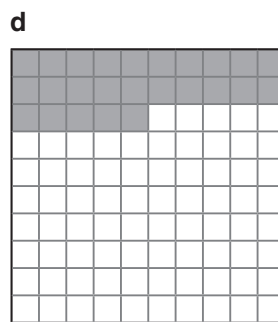
$$\frac{38}{100}$$

0.38



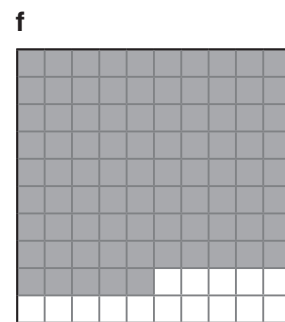
$$\frac{1}{10}$$

0.1



$$\frac{25}{100}$$

0.25



$$\frac{85}{100}$$

0.85



Write these decimals as mixed numbers. Simplify them if possible.

$$9.4 \rightarrow 9\frac{4}{10} \rightarrow 9\frac{2}{5}$$

a $1.5 \rightarrow 1\frac{1}{2}$

d $61.2 \rightarrow 61\frac{2}{10}$ or $61\frac{1}{5}$

b $7.1 \rightarrow 7\frac{1}{10}$

e $151.9 \rightarrow 151\frac{9}{10}$

c $18.7 \rightarrow 18\frac{7}{10}$

f $204.6 \rightarrow 204\frac{6}{10}$ or $204\frac{3}{5}$



Write these as mixed numbers. Simplify them if possible.

1.45 →

$$1\frac{45}{100}$$

a 2.93 →

$$2\frac{93}{100}$$

d 38.29 →

$$38\frac{29}{100}$$

b 7.82 →

$$7\frac{82}{100} \text{ or } 7\frac{41}{50}$$

e 154.78 →

$$154\frac{78}{100} \text{ or } 154\frac{39}{50}$$

c 14.05 →

$$14\frac{5}{100} \text{ or } 14\frac{1}{20}$$

f 206.07 →

$$206\frac{7}{100}$$

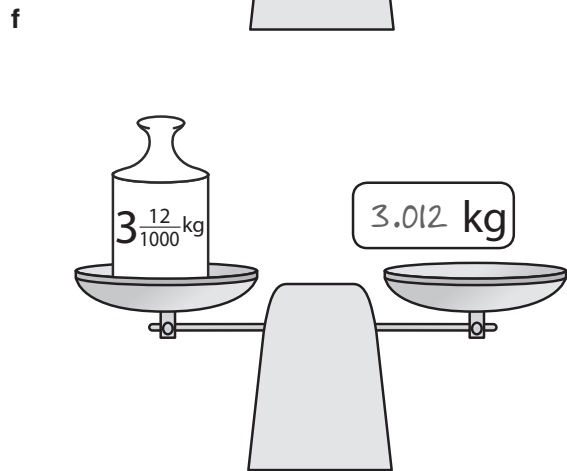
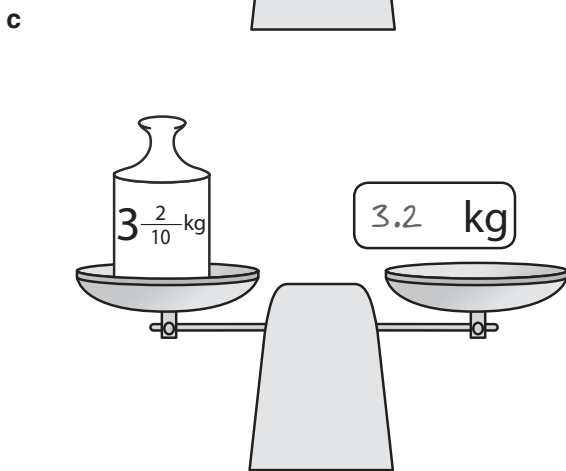
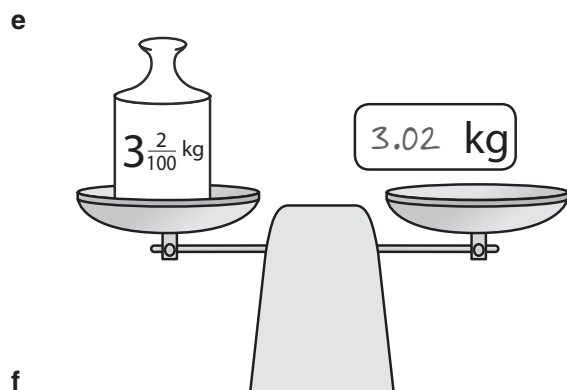
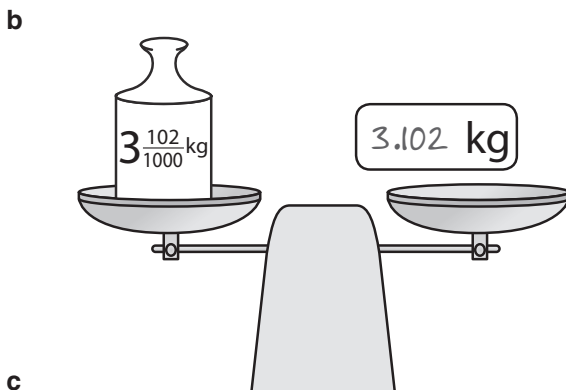
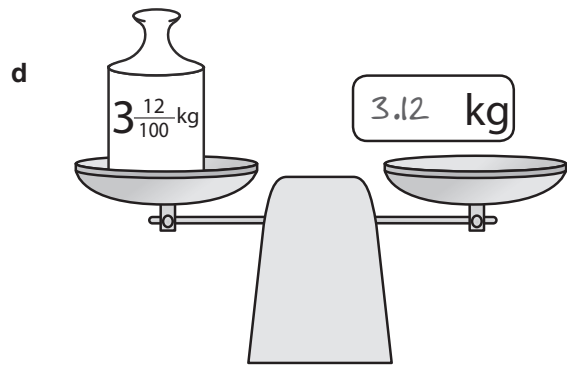
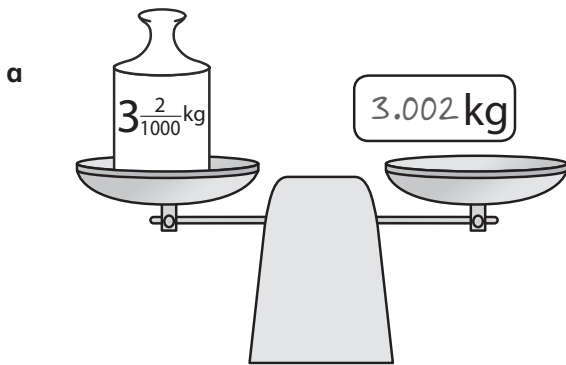
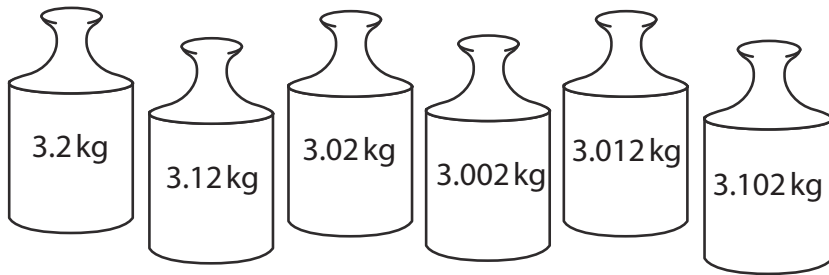


Complete this grid of equivalent fractions. Write each as a decimal.

Hundredths	Thousandths	Decimal
$\frac{12}{100}$	$\frac{120}{1000}$	0.12
$\frac{45}{100}$	$\frac{450}{1000}$	0.45
$\frac{36}{100}$	$\frac{360}{1000}$	0.36
$\frac{74}{100}$	$\frac{740}{1000}$	0.74
$\frac{89}{100}$	$\frac{890}{1000}$	0.89
$\frac{51}{100}$	$\frac{510}{1000}$	0.51
$\frac{47}{100}$	$\frac{470}{1000}$	0.47

5

Write the equivalent mass so that the scales balance. Choose from these masses.



1d Reading, writing and ordering decimal numbers



Use the symbols $>$ or $<$ to make each statement **true**.

- | | | | | | | | |
|---|-------|-----------------------------------|-------|---|--------|-----------------------------------|--------|
| a | 46.8 | <input type="text" value="<"/> | 48.6 | d | 560.56 | <input type="text" value="<"/> | 605.06 |
| b | 395.2 | <input type="text" value=">"/> | 359.5 | e | 94.82 | <input type="text" value=">"/> | 94.49 |
| c | 71.43 | <input type="text" value=">"/> | 71.38 | f | 102.7 | <input type="text" value=">"/> | 12.07 |



Write these numbers in order. Start with the **smallest**.

28.4	208.7	280.57	28.04	208.57	28.75
<input type="text" value="28.04"/>	<input type="text" value="28.4"/>	<input type="text" value="28.75"/>	<input type="text" value="208.57"/>	<input type="text" value="208.7"/>	<input type="text" value="280.57"/>
smallest					



Where does the number round to? Circle the number on each number line to show this.

- a 38.1 **38.15**
- b **77.44** 77.5
- c 90.2 **90.28**
- d **119.32** 119.4
- e 245.7 **245.76**



Round these numbers to the nearest **whole** number.

a 15.3

d 34.08

b 107.5

e 319.94

c 272.8

f 860.26



Round these numbers to the nearest **tenth**.

a 28.54

d 7.916

b 32.09


e 40.378


c 811.65


f 29.206





These show the amount of water in each container. Round each to the nearest **tenth** of a litre.


a 

d 

b 

e 

c 

f 



Rearrange each set of cards. Make a number as near as possible to 5 each time.

a

4	.	1	8
---	---	---	---

4.81

b

3	8	.	9
---	---	---	---

3.98

c

.	5	7	2
---	---	---	---

5.27

d

2	4	9	1	.
---	---	---	---	---

4.921

e

3	2	.	7	5
---	---	---	---	---

5.237

f

4	0	5	.	1
---	---	---	---	---

5.014

2a Mental calculation strategies



Use rounding and adjusting to answer these. Show your working.

3499 + 1507 =

Working:

3500 + 1500 = 5000 then add 7 and subtract 1

a 2504 + 4999 =

Working:

c 4503 + 1498 =

Working:

b 3498 + 5006 =

Working:

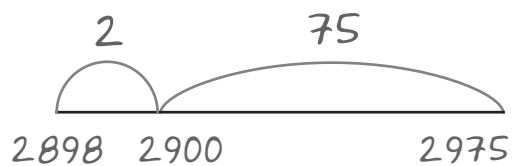
d 2510 + 5995 =

Working:



Use counting on to answer these.

2975 - 2898 =



a 3317 - 3250 =

b 1536 - 1496 =

c 6200 - 6098 =

d 1552 - 1493 =

e 4854 - 4600 =



Use the sequencing strategy to add these distances. Show how you partition the **smaller** number.

$$1152 \text{ km} + 836 \text{ km} = 1988 \text{ km}$$

Working:

$$1152 + 800 + 30 + 6$$

a $7433 \text{ km} + 425 \text{ km} = 7858 \text{ km}$

Working:

d $3844 \text{ km} + 2134 \text{ km} = 5978 \text{ km}$

Working:

b $1325 \text{ km} + 567 \text{ km} = 1892 \text{ km}$

Working:

e $5219 \text{ km} + 3362 \text{ km} = 8581 \text{ km}$

Working:

c $6048 \text{ km} + 791 \text{ km} = 6839 \text{ km}$

Working:

f $2260 \text{ km} + 4187 \text{ km} = 6447 \text{ km}$

Working:



Use a bar model to find the **difference** between these distances.

$$1485 \text{ km} - 1180 \text{ km} = 305 \text{ km}$$

1485	
1180	?

a $2009 \text{ km} - 1509 \text{ km} = 500 \text{ km}$

b $6830 \text{ km} - 6790 \text{ km} = 40 \text{ km}$

c $8771 \text{ km} - 4071 \text{ km} = 4700 \text{ km}$

d $3542 \text{ km} - 3400 \text{ km} = 142 \text{ km}$

e $5286 \text{ km} - 5146 \text{ km} = 140 \text{ km}$

5

Find the **totals** of these amounts of money.

a

£48.90 £76.15

£27.25

c

£17.66 £37.16

£19.50

b

£13.59 £50.47

£36.88

d

£70.75 £95.70

£24.95

6

Work out the **difference** between each pair of prices.

a

£63.82 £13.92

£49.90

c

£81.76 £42.49

£39.27

b

£14.25 £60.75

£75.00





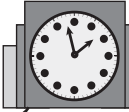
d

£46.53 £33.82

£80.35

7

Answer the questions about these clocks.

A	B	C	D	E
				
£85.75	£68.50	£72.98	£93.20	£79.45

a The difference in price between clock A and clock B is

£17.25

c Clock A costs £7.45 less than clock

D

b The total cost of clock C and clock E is

£152.43

d Clock A costs £12.77 more than clock

C

e Write the new price for each clock.

All clocks reduced by **£33.33**

A £52.42 B £35.17 C £39.65 D £59.87 E £46.12

1

Answer these.

$$\begin{array}{r} a \quad 1662 \\ + 4409 \\ \hline \end{array}$$

6071

$$\begin{array}{r} d \quad 72973 \\ + 1439 \\ \hline \end{array}$$

74412

$$\begin{array}{r} g \quad 49526 \\ + 41886 \\ \hline \end{array}$$

91412

$$\begin{array}{r} b \quad 5394 \\ + 2376 \\ \hline \end{array}$$

7770

$$\begin{array}{r} e \quad 3861 \\ + 19083 \\ \hline \end{array}$$

22944

$$\begin{array}{r} h \quad 17597 \\ + 55438 \\ \hline \end{array}$$

73035

$$\begin{array}{r} c \quad 3828 \\ + 5485 \\ \hline \end{array}$$

9313

$$\begin{array}{r} f \quad 28707 \\ + 34195 \\ \hline \end{array}$$

62902

$$\begin{array}{r} f \quad 40751 \\ + 53965 \\ \hline \end{array}$$

94716

2

Answer these.

$$\begin{array}{r} a \quad 6409 \\ - 2583 \\ \hline \end{array}$$

3826

$$\begin{array}{r} d \quad 77349 \\ - 8539 \\ \hline \end{array}$$

68810

$$\begin{array}{r} g \quad 80043 \\ - 41535 \\ \hline \end{array}$$

38508

$$\begin{array}{r} b \quad 9175 \\ - 3448 \\ \hline \end{array}$$

5727

$$\begin{array}{r} e \quad 28158 \\ - 7760 \\ \hline \end{array}$$

20398

$$\begin{array}{r} h \quad 55242 \\ - 49974 \\ \hline \end{array}$$

5268

$$\begin{array}{r} c \quad 5620 \\ - 1896 \\ \hline \end{array}$$

3724

$$\begin{array}{r} f \quad 41265 \\ - 20557 \\ \hline \end{array}$$

20708

$$\begin{array}{r} i \quad 73095 \\ - 31568 \\ \hline \end{array}$$

41527

3

Use the prices below to answer these questions.

Write your calculations using a written method.

A £348.56

C £408.19

E £583.38

B £195.63

D £225.67

F £370.06

a $A + C =$ £756.75 Working:

b $D + F =$ £595.73

c $E + B =$ £779.01

d $C - D =$ £182.52

e $E - A =$ £234.82

f $F - B =$ £174.43

4

Answer these problems.

a A lorry collected 9 new cars from a factory in Berlin and travelled 1089 km to Paris to drop off 5 cars. It then travelled another 1274 km to Madrid to drop off the other 4 cars. How far did the lorry travel in total?

2363 km

b A dining table costs £379.49. A set of 4 chairs costs £568.98. How much will it cost to buy the table and chairs together?

£948.47

c 2 tankers deliver fuel to a petrol station. One tanker holds 38365 litres. The other tanker holds 35495 litres. How many litres of petrol is delivered in total?

73860 l

d A farmer collected 13346 eggs in a month. She only sent 12589 eggs to the supermarket as eggs with cracks were removed. How many eggs had cracks in this month?

757

e A computer costs £913.22. The price will be reduced by £137.99 if you bring in your old computer. How much will you spend on a new computer if you bring in an old computer?

£775.23

f The total distance of a flight from London to Sydney in Australia is 17205 km. The plane lands after 5487 km in Dubai. It then flies on to Sydney. How much further does it have to fly from Dubai to Sydney?

11718 km



Use the digits 1 to 9 to complete these calculations.



a

$$\begin{array}{r} 4\ 7\ 3\ \boxed{8} \\ +\ 4\ 6\ 9\ 2 \\ \hline 9\ \boxed{4}\ 3\ 0 \end{array}$$

c

$$\begin{array}{r} \boxed{1}\ 5\ 5\ 0\ \boxed{9} \\ +\ 3\ 7\ 1\ 9\ 7 \\ \hline 5\ 2\ \boxed{7}\ 0\ 6 \end{array}$$

b

$$\begin{array}{r} 7\ 2\ \boxed{3}\ 4 \\ -\ \boxed{2}\ 9\ 8\ 5 \\ \hline 4\ 2\ 4\ 9 \end{array}$$

d

$$\begin{array}{r} 8\ 1\ 1\ \boxed{5}\ 2 \\ -\ 6\ \boxed{6}\ 7\ 9\ 9 \\ \hline 1\ 4\ 3\ 5\ 3 \end{array}$$



Use these numbers to answer the questions.

17 512

9156

12 334

16 972

8548

a What is the **largest** total that can be made from adding any 2 of these numbers?

$34\ 484\ (17\ 512 + 16\ 972)$

b What is the **smallest** total that can be made from adding any 2 of these numbers?

$17\ 704\ (9156 + 8548)$

c Which 2 numbers have the **smallest** difference?

$17\ 512\ \text{and}\ 16\ 972$

d Which 2 numbers added together gives the **total** of 26060?

$17\ 512\ \text{and}\ 8548$

e Which 2 numbers have a **difference** of 3178?

$12\ 334\ \text{and}\ 9156$

3a Exploring multiples, factors, squares and cubes

1

Write in the missing numbers on this multiplication grid. Circle all the square numbers.

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	64	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

2

Answer these.

$1 \times 1 =$

1^2

$= 1$

$f \quad 7 \times 7 =$

7^2

$= 49$

$a \quad 2 \times 2 =$

2^2

$= 4$

$g \quad 8 \times 8 =$

8^2

$= 64$

$b \quad 3 \times 3 =$

3^2

$= 9$

$h \quad 9 \times 9 =$

9^2

$= 81$

$c \quad 4 \times 4 =$

4^2

$= 16$

$i \quad 10 \times 10 =$

10^2

$= 100$

$d \quad 5 \times 5 =$

5^2

$= 25$

$j \quad 11 \times 11 =$

11^2

$= 121$

$e \quad 6 \times 6 =$

6^2

$= 36$

$k \quad 12 \times 12 =$

12^2

$= 144$

Talk about any patterns you notice. What is the next square number? **169**



Answer these.

$1 \times 1 \times 1 = 1^3 = 1$

$7 \times 7 \times 7 = 7^3 = 343$

a $2 \times 2 \times 2 = 2^3 = 8$

g $8 \times 8 \times 8 = 8^3 = 512$

b $3 \times 3 \times 3 = 3^3 = 27$

h $9 \times 9 \times 9 = 9^3 = 729$

c $4 \times 4 \times 4 = 4^3 = 64$

i $10 \times 10 \times 10 = 10^3 = 1000$

d $5 \times 5 \times 5 = 5^3 = 125$

j $11 \times 11 \times 11 = 11^3 = 1331$

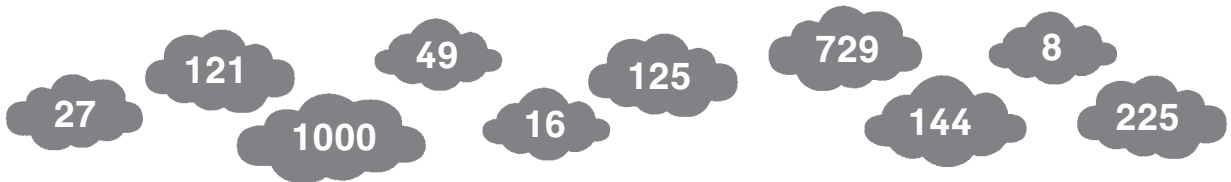
e $6 \times 6 \times 6 = 6^3 = 216$

k $12 \times 12 \times 12 = 12^3 = 1728$

Talk about any patterns you notice.



Write the following numbers in the correct column.



Square numbers			Cube numbers		
121	16	225	27	125	8
49	144		1000	729	



Write all the common multiples up to 99 for each pair of numbers.

a 3 and 10 $30, 60, 90$

b 4 and 5 $20, 40, 60, 80$

c 6 and 9 $18, 36, 54, 72, 90$

d 7 and 3 $21, 42, 63, 84$



List the factors for each of these numbers.

a 48

1, 2, 3, 4, 6, 8, 12, 16, 24, 48

b 70

1, 2, 5, 7, 10, 14, 35, 70

c 24

1, 2, 3, 4, 6, 8, 12, 24

d 60

1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60

e 96

1, 2, 4, 6, 8, 12, 16, 24, 48, 96

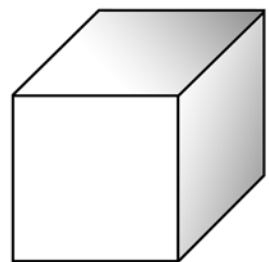
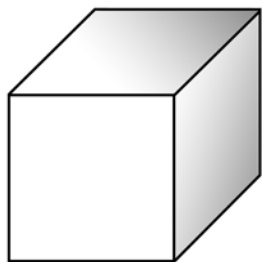
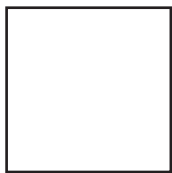


Can you think of 2 square numbers which are also cube numbers?

Label these squares and cubes to prove it.

64

729

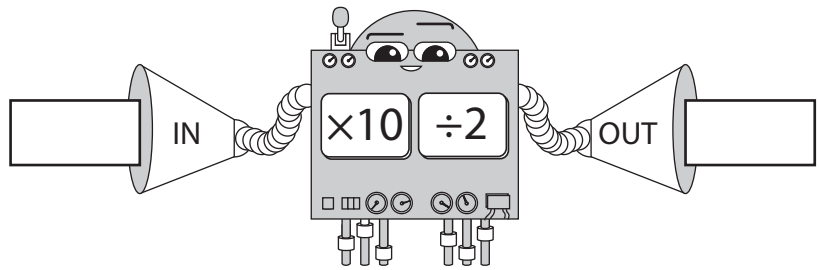


For example: $64 = 4^3 = 8^2$

$729 = 9^3 = 27^2$

1

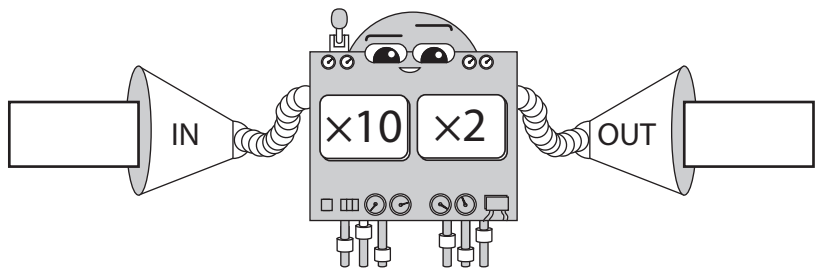
Write the numbers coming **out** of this function machine in the table below.



IN	28	59	95	468	746	987
OUT	140	295	475	2340	3730	4935

2

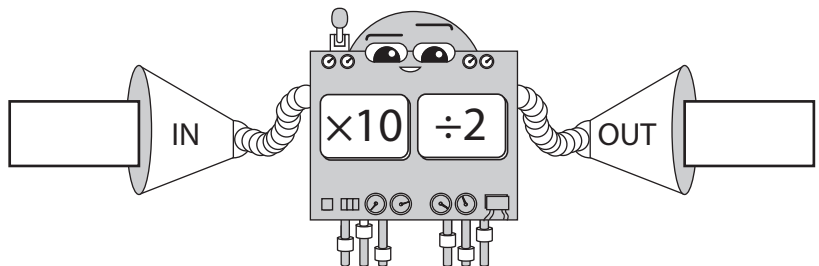
Write the numbers coming **out** of this function machine in the table below.



IN	28	59	95	468	746	987
OUT	560	1180	1900	9360	14 920	19 740

3

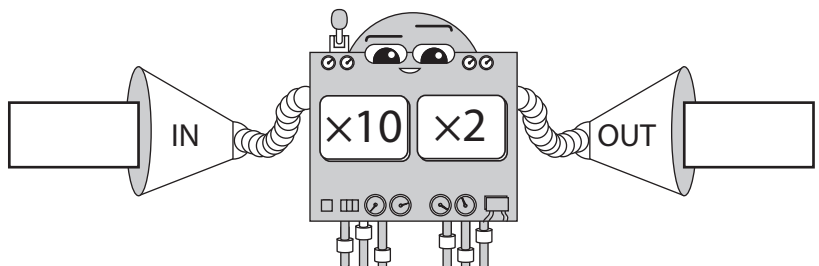
Write the missing numbers in the table below.



IN	471	196	1085	620	7356	1688
OUT	2355	980	5425	3100	36 780	8440

4

Write the missing numbers in the table below.



IN	471	49	1085	155	7356	422
OUT	9420	980	21 700	3100	14 7120	8440



Answer these. Decide whether to multiply or divide by 10, and then whether to double or half.

a $340 \times 20 =$

e $2680 \div 20 =$

b $340 \times 5 =$

f $2680 \times 5 =$

c $340 \div 20 =$

g $2680 \times 20 =$

d $340 \div 5 =$

h $2680 \div 5 =$



Use each boxed fact to help answer the other questions.

a $7 \times 5 =$

$70 \times 5 =$

$14 \times 5 =$

$7 \times 0.5 =$

$7 \times 15 =$

b $3 \times 8 =$

$30 \times 8 =$

$3 \times 16 =$

$30 \times 80 =$

$3 \times 0.8 =$

c $48 \div 4 =$

$480 \div 4 =$

$4800 \div 4 =$

$4.8 \div 4 =$

d $56 \div 7 =$

$560 \div 7 =$

$5600 \div 7 =$

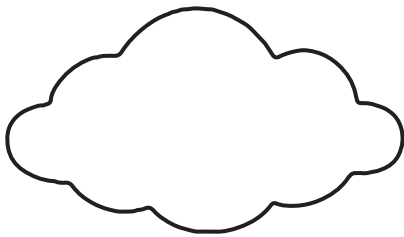
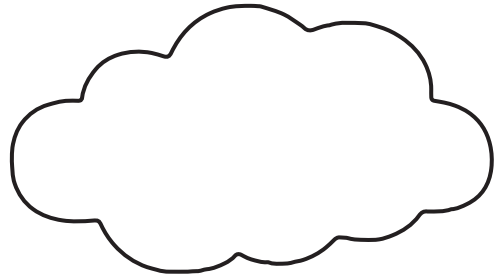
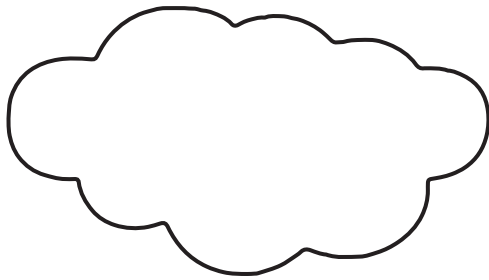
$5.6 \div 7 =$

7

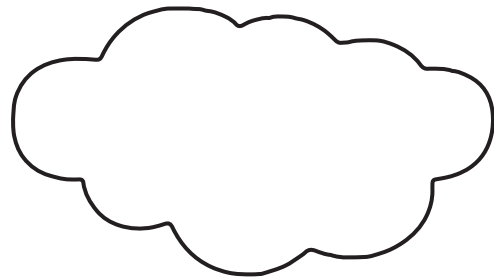
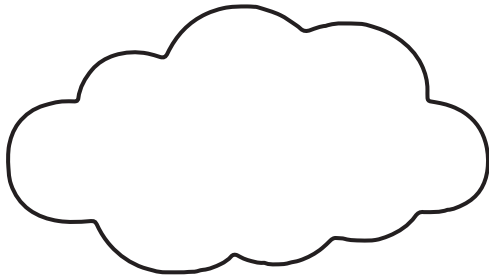
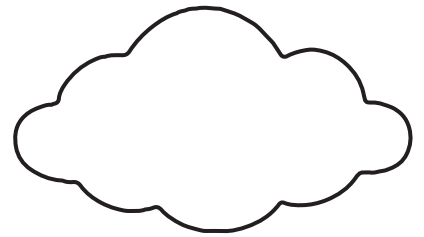
First write any multiplication fact in the box.

Then write other facts you can work out from this. Write them in the clouds.

Do **not** write the answers.



Check all the
multiplication
facts.



8

Now write the answers to your facts in any order in the boxes below.

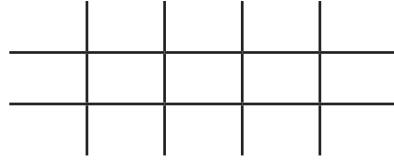
Ask a partner to see if they can match the answers to the questions.

Check all the multiplication fact answers.

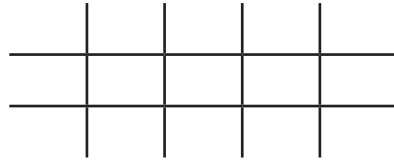


Use the grid method to answer these.

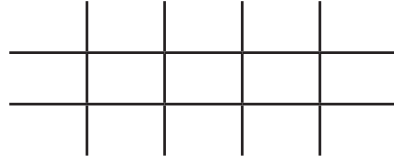
a $367 \times 4 =$



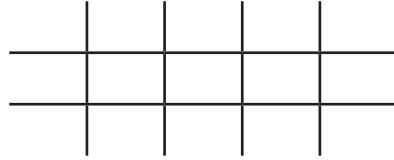
b $288 \times 7 =$



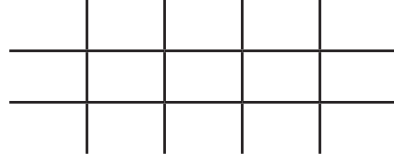
c $915 \times 8 =$



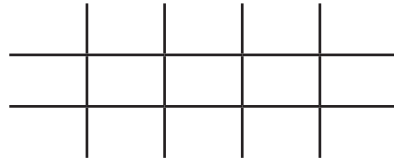
d $459 \times 3 =$



e $726 \times 9 =$



f $583 \times 6 =$



Now use the vertical written method to answer these. Compare the two methods.

a
$$\begin{array}{r} 367 \\ \times \quad 4 \\ \hline \end{array}$$

c
$$\begin{array}{r} 915 \\ \times \quad 8 \\ \hline \end{array}$$

e
$$\begin{array}{r} 726 \\ \times \quad 9 \\ \hline \end{array}$$

b
$$\begin{array}{r} 288 \\ \times \quad 7 \\ \hline \end{array}$$

d
$$\begin{array}{r} 459 \\ \times \quad 3 \\ \hline \end{array}$$

f
$$\begin{array}{r} 583 \\ \times \quad 6 \\ \hline \end{array}$$



Use a grid method or column method to answer each of these.

<p>a New car tyres costs £194 each. How much would it cost to put 4 new tyres on a car?</p> <p style="text-align: right;"><i>£776</i></p>	<p>c There are 6 cans of drink in a pack. Each can holds 330ml of juice. How much juice is there altogether?</p> <p style="text-align: right;"><i>1980 ml</i></p>
<p>b A bus travels 267 km every day from Monday to Friday. How many kilometres does the bus travel in total over these 5 days?</p> <p style="text-align: right;"><i>1335 km</i></p>	<p>d A dog needs 185 g of food a day. How much food will the dog need in a week?</p> <p style="text-align: right;"><i>1295 g</i></p>



Answer these using the short written method.

a
$$\begin{array}{r} 96 \\ 4 \overline{) 384} \end{array}$$

c
$$\begin{array}{r} 79 \\ 5 \overline{) 395} \end{array}$$

e
$$\begin{array}{r} 113 \\ 8 \overline{) 904} \end{array}$$

b
$$\begin{array}{r} 87 \\ 6 \overline{) 522} \end{array}$$

d
$$\begin{array}{r} 154 \\ 3 \overline{) 462} \end{array}$$

f
$$\begin{array}{r} 62 \\ 9 \overline{) 558} \end{array}$$



Use a **written** method to answer each of these.

a A team of 4 children enters a swimathon. The team swims a total of 976 m. Each child swims the same distance. How many metres did each child swim?

244 m

c A group of 9 friends visits a theme park. The total cost of the tickets was £324. What was the cost of one ticket?

£36

b 984 ml of juice is poured equally into 8 glasses. How much juice is in each glass?

123 ml

d A pizza has a mass of 870 g and is shared equally into 6 slices. What is the mass of each slice?

145 g

6

YOU WILL NEED:

- digit cards 1–9

Shuffle the digit cards. Turn over the top 4 cards. Place the digit cards in these spaces.

--	--	--

\times

--

Check the answers match the digits placed in the multiplication.

Rearrange the digits to answer these questions.

a What is the **largest** product you can make?

--

b What is the **smallest** product you can make?

--

7

YOU WILL NEED:

- digit cards 1–9

Shuffle the digit cards. Turn over the top 4 cards. Place the digit cards in these spaces.

--

--

--

--

Rearrange the digits to answer these questions.

a What is the **largest** whole number quotient you can make?

--

b Can you make a quotient that is a multiple of 3?

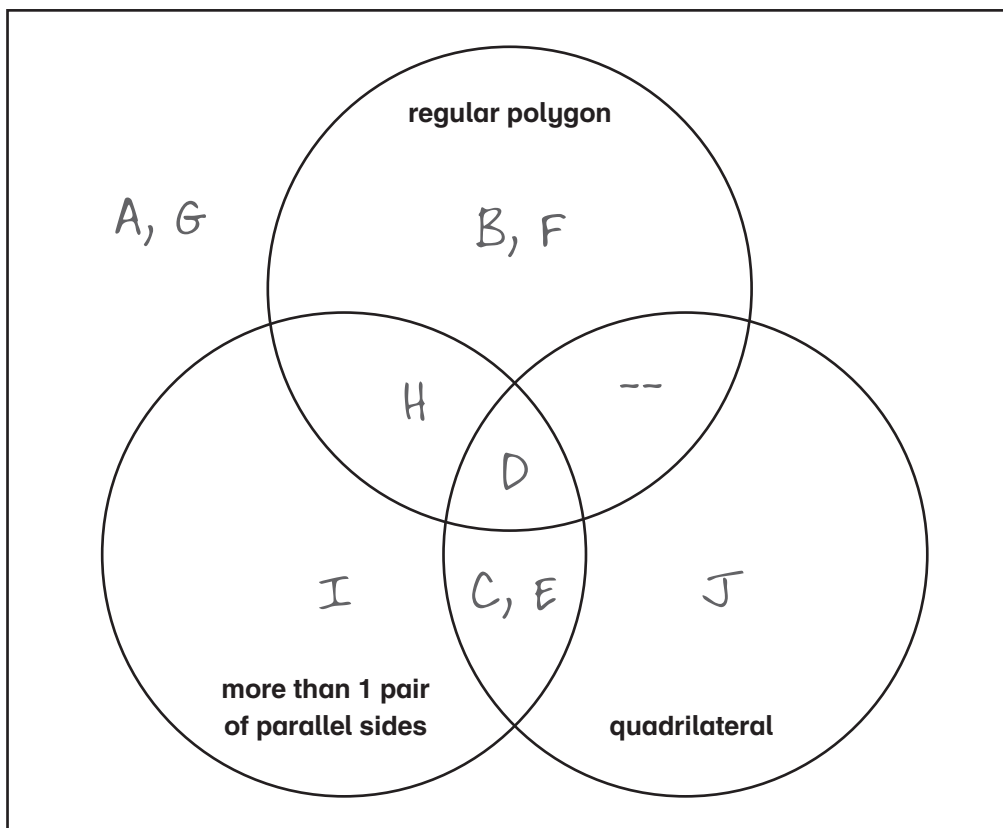
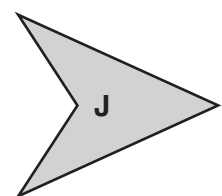
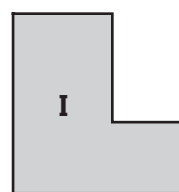
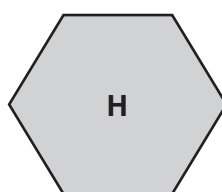
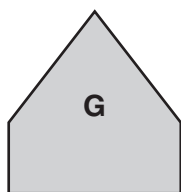
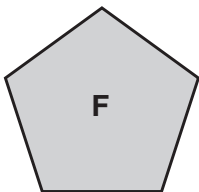
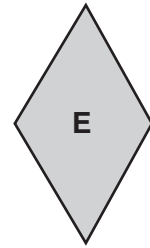
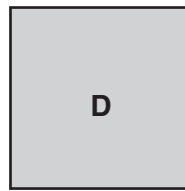
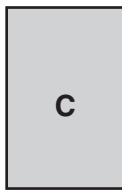
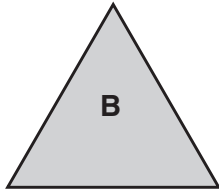
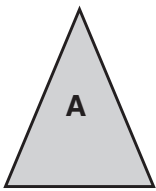
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Check the answers match the digits placed in the multiplication.

4a Regular or irregular?

1

Complete this Venn diagram for the shapes above. Write in the letters A to J.

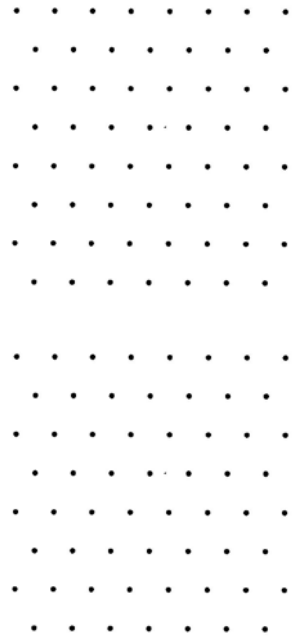
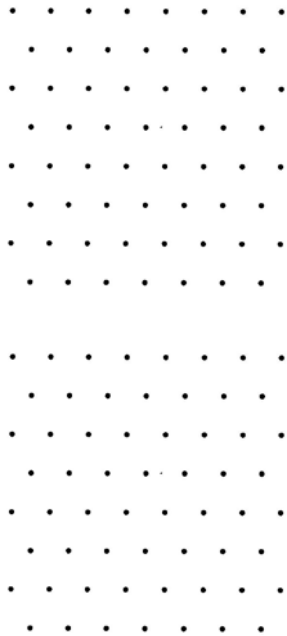
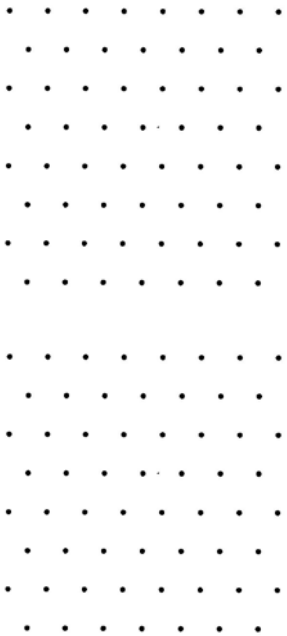


2

YOU WILL NEED:

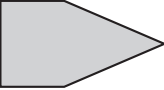

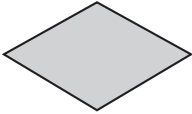
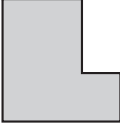
- ruler
- red crayon or pencil

Draw a different triangle on each of these grids. Include a regular triangle. Colour it red.



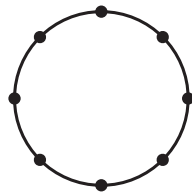
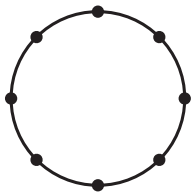
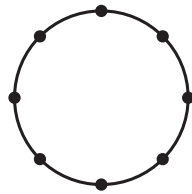
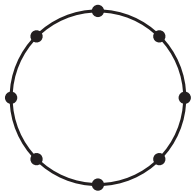
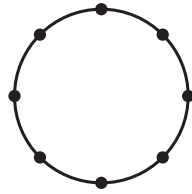
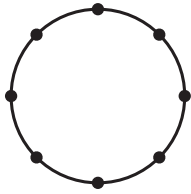
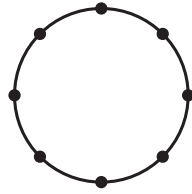
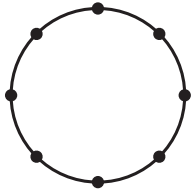
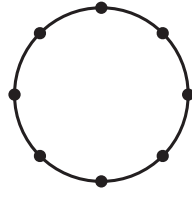
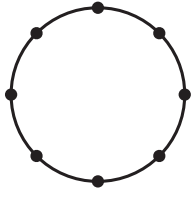
3

Complete this chart. Tick (✓) the properties for each shape.

Shape	1 or more right angles	1 or more acute angles	1 or more pairs of sides of equal length	1 or more pairs of parallel lines
	✓	✓	✓	✓
		✓	✓	
		✓	✓	✓
	✓			✓

4

Investigate all the different quadrilaterals that can be made by joining the dots on a circle.



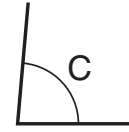
Check each shape is a quadrilateral.

4b Angles

1

YOU WILL NEED:

- protractor



Estimate these angles first.

Then use a protractor to check your estimate.

Angle	Estimate	Measure
A	60°	
B	35°	
C	85°	
D	23°	
E	114°	
F	48°	

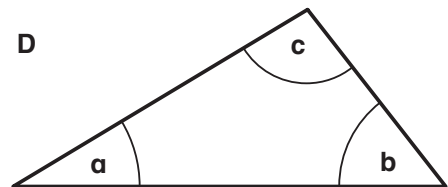
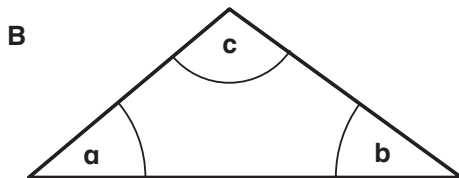
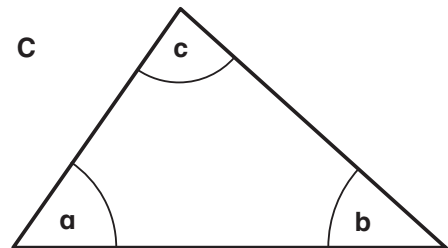
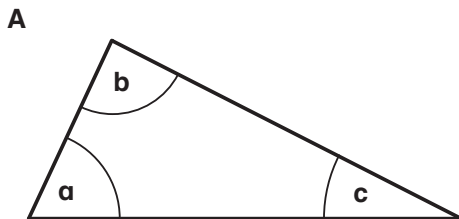
2

YOU WILL NEED:

- protractor

Measure the angles of these triangles. Complete the table.

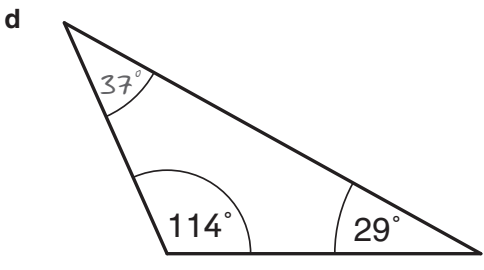
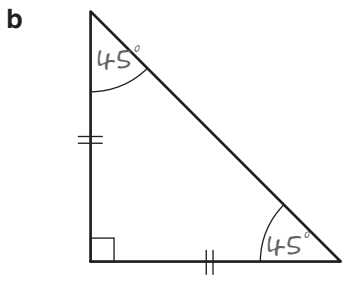
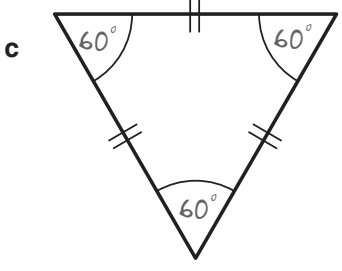
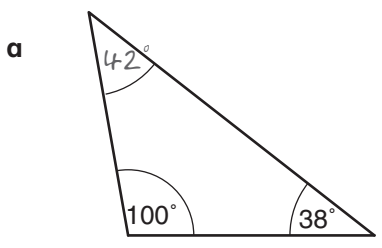
If any angles in a triangle do not total 180°, check them again.



Triangle	A	B	C	D
Angle a	65°	40°	55°	31°
Angle b	88°	36°	42°	52°
Angle c	27°	104°	83°	97°
Total	180°	180°	180°	180°

3

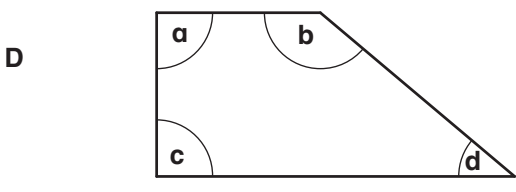
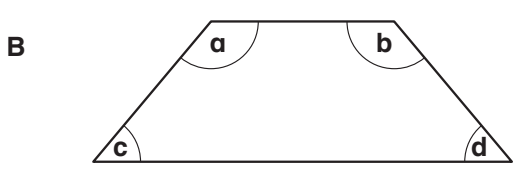
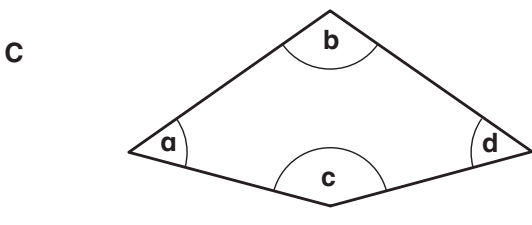
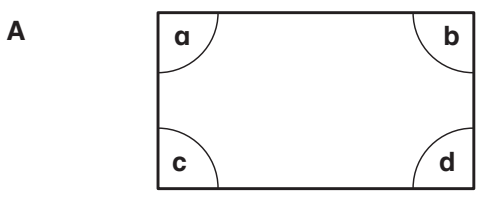
Calculate the size of the missing angles in each triangle. Write your answer in the boxes.



4

YOU WILL NEED:
• protractor

Measure the angles inside each of these quadrilaterals. Calculate the total of each.



Quadrilateral	A	B	C	D
Angle a	90°	130°	50°	90°
Angle b	90°	130°	110°	90°
Angle c	90°	50°	50°	140°
Angle d	90°	50°	150°	40°
Total	360°	360°	360°	360°

Write what you notice. *The angles in a quadrilateral total 360°.*

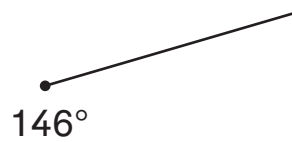
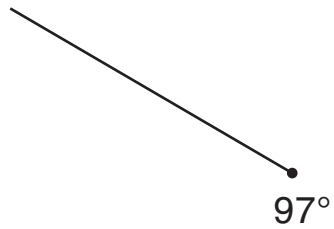
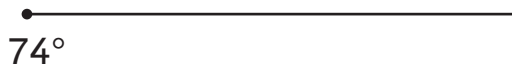
1

YOU WILL NEED:

- ruler
- protractor

Draw lines to show these angles from the dot.

Check angles are drawn accurately.





YOU WILL NEED:

- ruler
- protractor

Follow the instructions to complete the triangles. One side has been drawn for you to start with.

Check triangles are drawn accurately.

a an isosceles triangle with two angles of 55°



d an isosceles triangle with a base of 5 cm and two angles of 28°



b an equilateral triangle with angles of 60°



e a right-angled triangle with sides of 3 cm, 4 cm and 5 cm



c a right-angled triangle with angles of 25° and 65°



f an equilateral triangle with sides of 45 mm



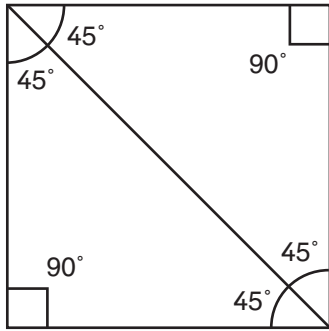
3

YOU WILL NEED:

- ruler
- protractor

The interior angles of a square add up to 360° .

This is double the angle sum of a triangle because a square can be made from two triangles.

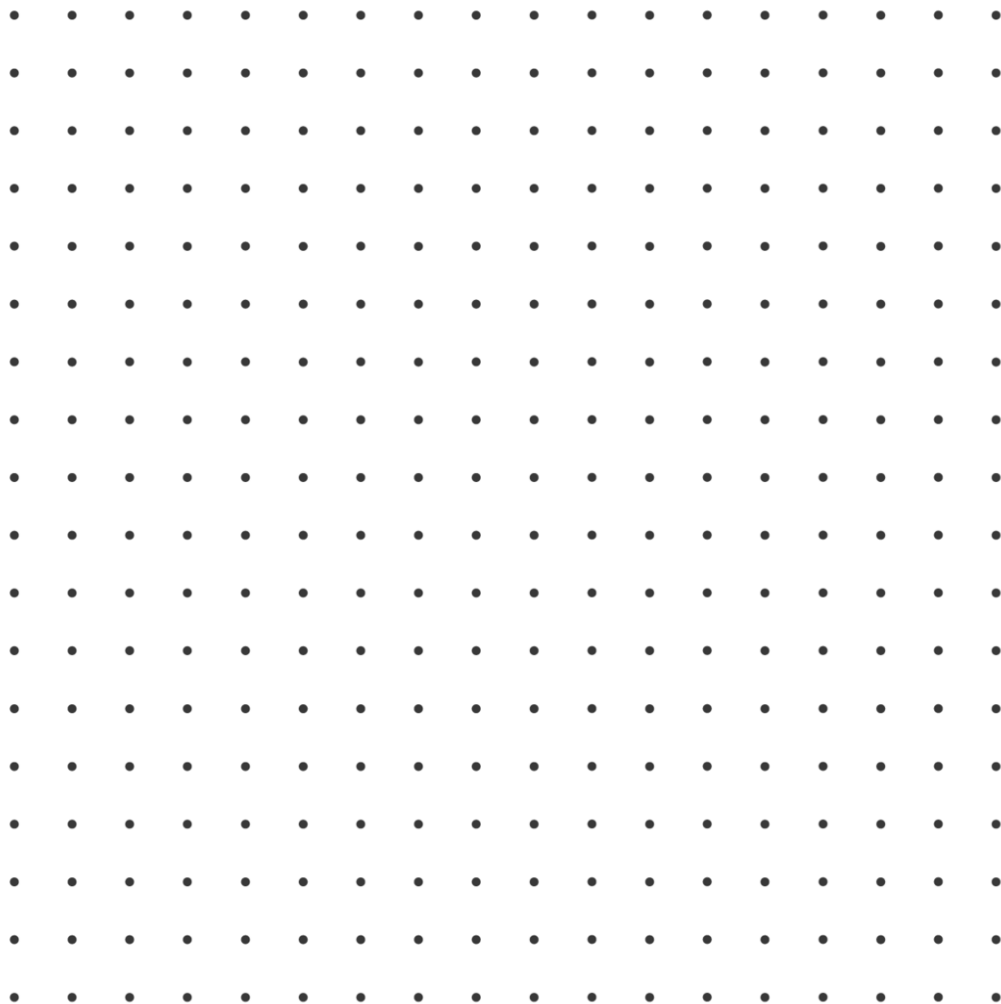


Check triangles are drawn accurately.

Draw different quadrilaterals on this grid.

Measure the interior angle sum of each quadrilateral.

Then draw a line to make two triangles on each. Check the totals.



5a Place holders and comparing

1 Write these numerals as words.

a 3489 → Three thousand four hundred and eighty-nine

30 489 → Thirty thousand four hundred and eighty-nine

b 296 → Two hundred and ninety-six

200 096 → Two hundred thousand and ninety-six

c 1475 → One thousand four hundred and seventy-five

140 705 → One hundred and forty thousand seven hundred and five

d 3618 → Three thousand six hundred and eighteen

306 018 → Three hundred and six thousand and eighteen

2 Convert these to grams.

a 1 kg 750 g

1750 g

c 1 kg 25 g

1025 g

e 2 kg 75 g

2075 g

b 1 kg 175 g

1175 g

d 3 kg 200 g

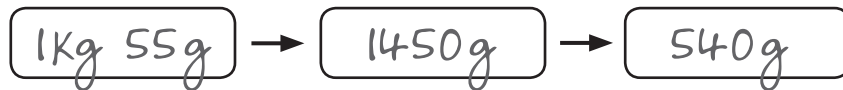
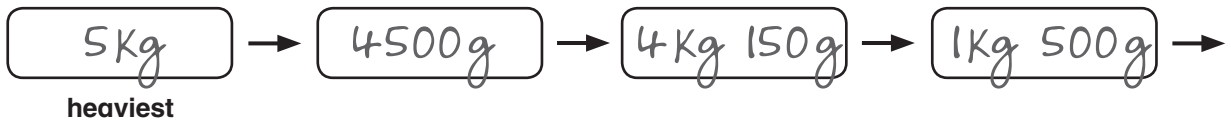
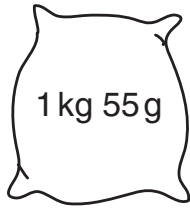
3200 g

f 4 kg 950 g

4950 g

3

Write the mass of these bags of potatoes in order. Start with the **heaviest**.



4

Write $<$, $>$ or $=$ to make each statement **true**.

a $15\text{ kg } 25\text{ g} + 725\text{ g}$ $>$ 5750 g

b 3 kg $=$ $1750\text{ g} + 1250\text{ g}$

c $1\text{ kg } 250\text{ g}$ $>$ $100\text{ g} + 250\text{ g}$

d 6175 g $<$ $2100\text{ g} + 4750\text{ g}$

e 4540 g $=$ $2040\text{ g} + 2500\text{ g}$

f $2\text{ kg } 50\text{ g}$ $<$ $1\text{ kg} + 1500\text{ g}$

5b Positive and negative numbers



1 Write the missing numbers in each sequence.

a

-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5
----	----	----	----	----	----	----	----	---	---	---	---	---	---

b

-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2
-----	-----	-----	-----	----	----	----	----	----	----	----	----

c

-16	-14	-12	-10	-8	-6	-4	-2	0	2	4	6
-----	-----	-----	-----	----	----	----	----	---	---	---	---

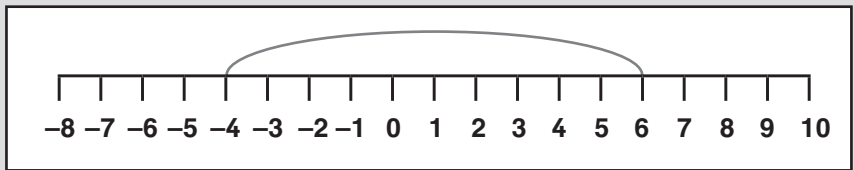
d

-16	-14	-12	-10	-8	-6	-4	-2	0	2	4	6
-----	-----	-----	-----	----	----	----	----	---	---	---	---

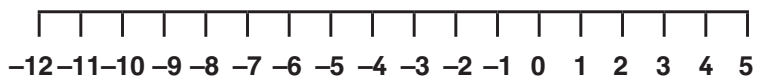


2 Answer these. Use the number lines to show each calculation.

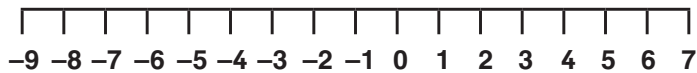
$6 - 10 =$



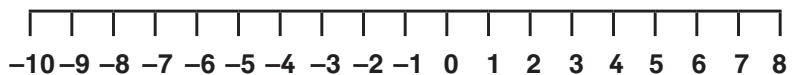
a $-8 + 11 =$



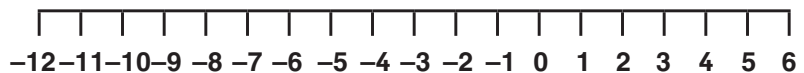
b $6 - 14 =$



c $-7 + 13 =$



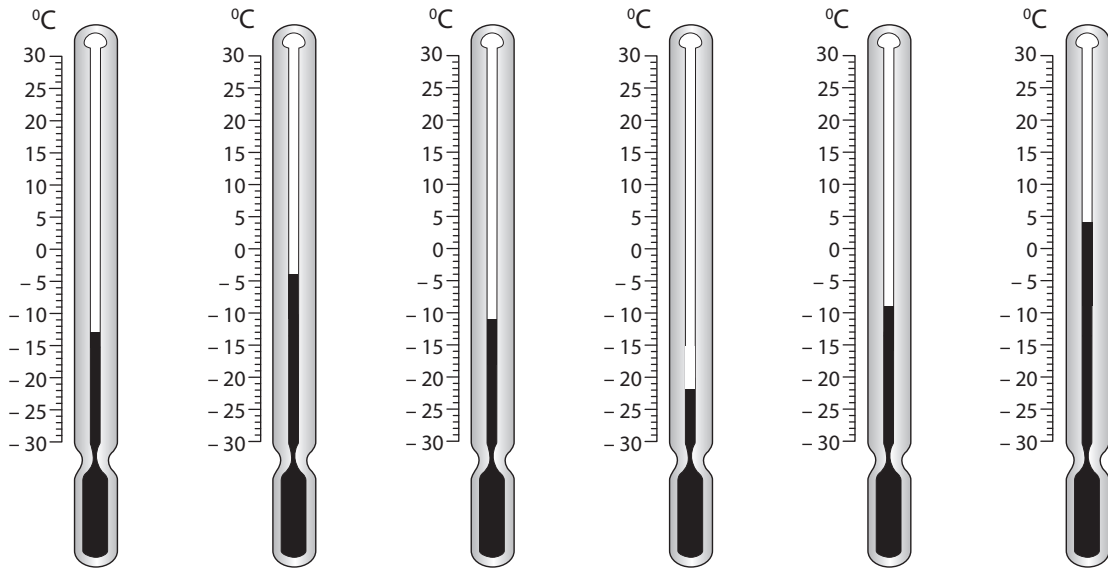
d $4 - 15 =$



3

Write the temperatures in order. Start with the **lowest**.

a



-22°C -13°C -11°C -9°C -4°C 4°C

lowest temperature

b What is the **difference** between the lowest and highest temperatures?

18°C

4

Which floor do you reach?

a You get in the lift on the 4th floor. You go down 6 floors and up 1 floor.

Floor -1

b You get in the lift on the -3 floor. You go up 10 floors and down 4 floors.

Floor 3

c You get in the lift on the 0 floor. You go up 3 floors, down 5 floors and up 1 floor.

Floor -1

d You get in the lift on the 8th floor. You go down 10 floors, up 6 floors and down 9 floors.

Floor -5

e Make up your own lift problem like the ones to the left.

10	2
9	1
8	0
7	-1
6	-2
5	-3
4	-4
3	-5

Check lift problem questions and answers.

5c Roman numerals



Complete this grid.

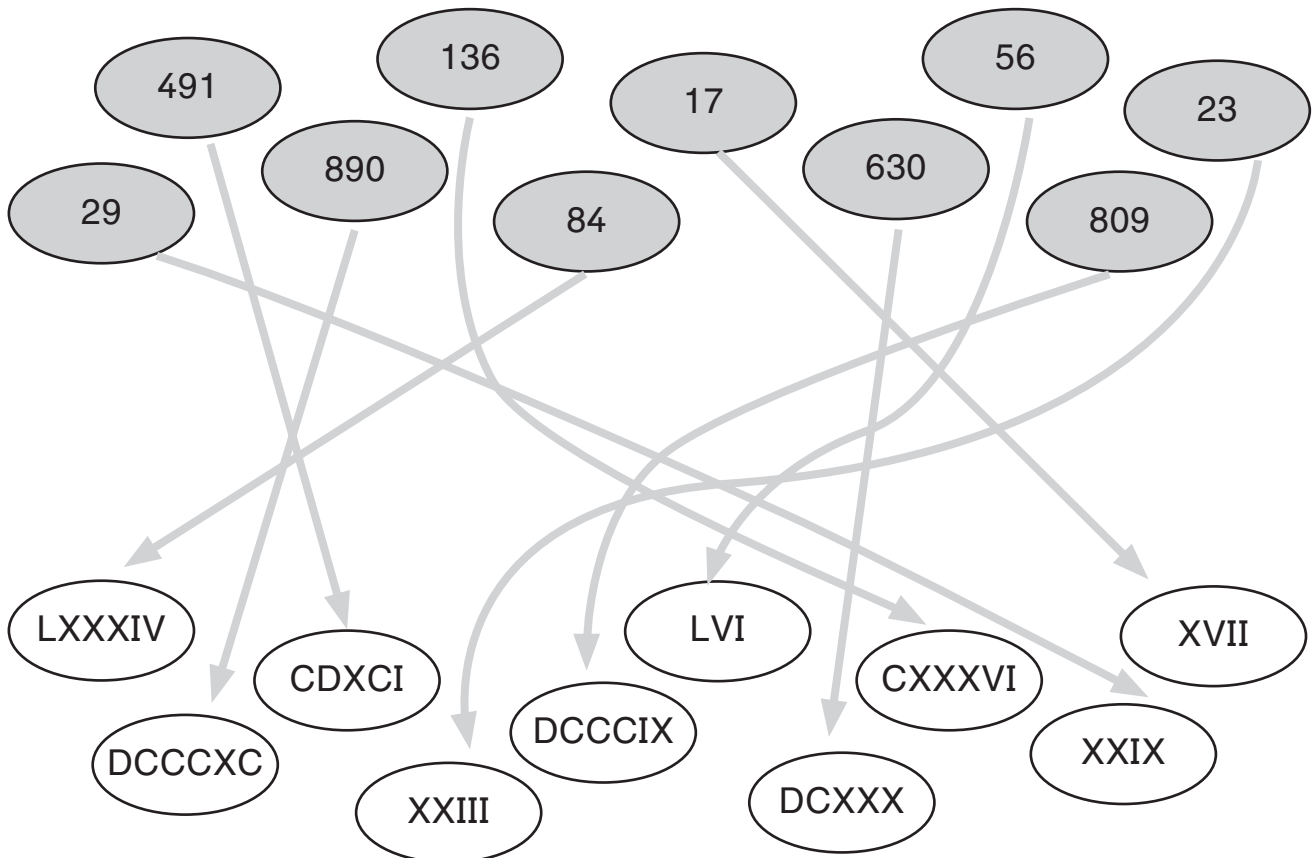
I	II	III	IV	V	VI	VII	VIII	IX
1	2	3	4	5	6	7	8	9

X	XX	XXX	XL	L	LX	LXX	LXXX	XC
10	20	30	40	50	60	70	80	90

C	CC	CCC	CD	D	DC	DCC	DCCC	CM
100	200	300	400	500	600	700	800	900



Draw lines to match the numbers and Roman numerals.





Write these Roman numerals as numbers.

a XXI

d CXCIX

b LXIII

e CCCLXXXIV

c LXXXIV

f DCCLVI



Write these numbers as Roman numerals.

a 28

d 92

b 39

e 185

c 74

f 370



Investigate the Roman numerals up to 99 that you can make with different numbers of straight lines. Some examples have been included for you.

Number of lines	Lines	Roman numerals
1		I
2		II V X L
3		
4		
5		

Check each Roman numeral is placed correctly on the chart.

6a Mental or written methods?

1

Answer these. Colour the stars if you used a mental method.

a $1385 + 121 =$ ☆ e $6993 + 2008 =$ ☆

b $4067 + 320 =$ ☆ f $5900 + 1629 =$ ☆

c $2546 + 487 =$ ☆ g $1774 + 3485 =$ ☆

d $3731 + 859 =$ ☆ h $8259 + 1674 =$ ☆

2

Answer these. Colour the stars if you used a mental method.

a $2481 - 165 =$ ☆ e $9402 - 8990 =$ ☆

b $3921 - 601 =$ ☆ f $6511 - 3470 =$ ☆

c $7009 - 498 =$ ☆ g $8235 - 2766 =$ ☆

d $5370 - 754 =$ ☆ h $7645 - 4103 =$ ☆



Choose to use a mental or a written method each time to find the total or difference.
Remember to check that both units of measurement are the same before calculating.
Write your answers in **kilograms**.

- a $642\text{ g} + 9\text{ kg} =$ 9.642 kg
- b $11.25\text{ kg} + 308\text{ g} =$ 11.558 kg
- c $7.1\text{ kg} + 300\text{ g} + 450\text{ g} =$ 7.85 kg
- d $6\text{ kg} + 1987\text{ g} =$ 7.987 kg
- e $5.68\text{ kg} - 2.49\text{ kg} =$ 3.19 kg
- f $13.06\text{ kg} - 3.54\text{ kg} =$ 9.52 kg
- g $6750\text{ g} - 2.88\text{ kg} =$ 3.87 kg



These parcels need to be put into pairs to find their total mass.
Choose some pairs that you can add mentally.
Choose some other pairs for which you need to use a written method.



Mental method	Written method
<p>_____ and _____ total _____</p> <p><i>Check the calculations are correct and the methods used.</i></p>	<p>+ _____</p> <p>_____</p>



Answer these.

For each one, make up another calculation with the **same** answer that you can solve mentally.

a
$$\begin{array}{r} 1805 \\ + 7195 \\ \hline \end{array}$$

9000

e
$$\begin{array}{r} 6734 \\ - 3729 \\ \hline \end{array}$$

3005

b
$$\begin{array}{r} 2743 \\ + 2657 \\ \hline \end{array}$$

5400

f
$$\begin{array}{r} 4047 \\ - 2048 \\ \hline \end{array}$$

1999

c
$$\begin{array}{r} 6254 \\ + 1938 \\ \hline \end{array}$$

8192

g
$$\begin{array}{r} 9165 \\ - 1857 \\ \hline \end{array}$$

7308

d
$$\begin{array}{r} 3481 \\ + 2975 \\ \hline \end{array}$$

6456

h
$$\begin{array}{r} 8620 \\ - 2693 \\ \hline \end{array}$$

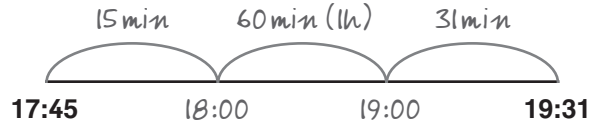
5927

6b Don't forget to check!



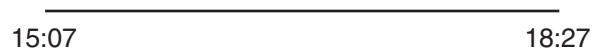
Use the number lines to work out the interval between the start and finish times.

Start	Finish	Time interval
17:45	19:31	1 hour 46 minutes



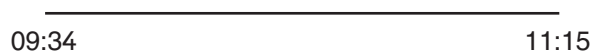
a

Start	Finish	Time interval
15:07	18:27	3 hours 20 minutes



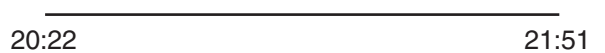
b

Start	Finish	Time interval
09:34	11:15	1 hour 41 minutes



c

Start	Finish	Time interval
20:22	21:51	1 hour 29 minutes



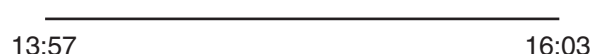
d

Start	Finish	Time interval
08:11	12:49	4 hours 38 minutes



e

Start	Finish	Time interval
13:57	16:03	2 hours 6 minutes



f

Start	Finish	Time interval
10:43	13:35	2 hours 52 minutes



This table has the mass in kilograms of different whales. Use this data to answer the questions.

Type of whale	Humpback	Killer	Grey	Minke	Bryde's
Mass (kg)	29973	3988	28049	7582	15216

a David estimated that the total mass of two whales is 36000 kg. Which two whales are they?

Grey and Minke

b What is the exact total mass of these two whales?

35631 Kg

c Which whale is about **half** the mass of a Bryde's whale?

Minke

d Calculate **half** the mass of the Bryde's whale exactly.

7608Kg

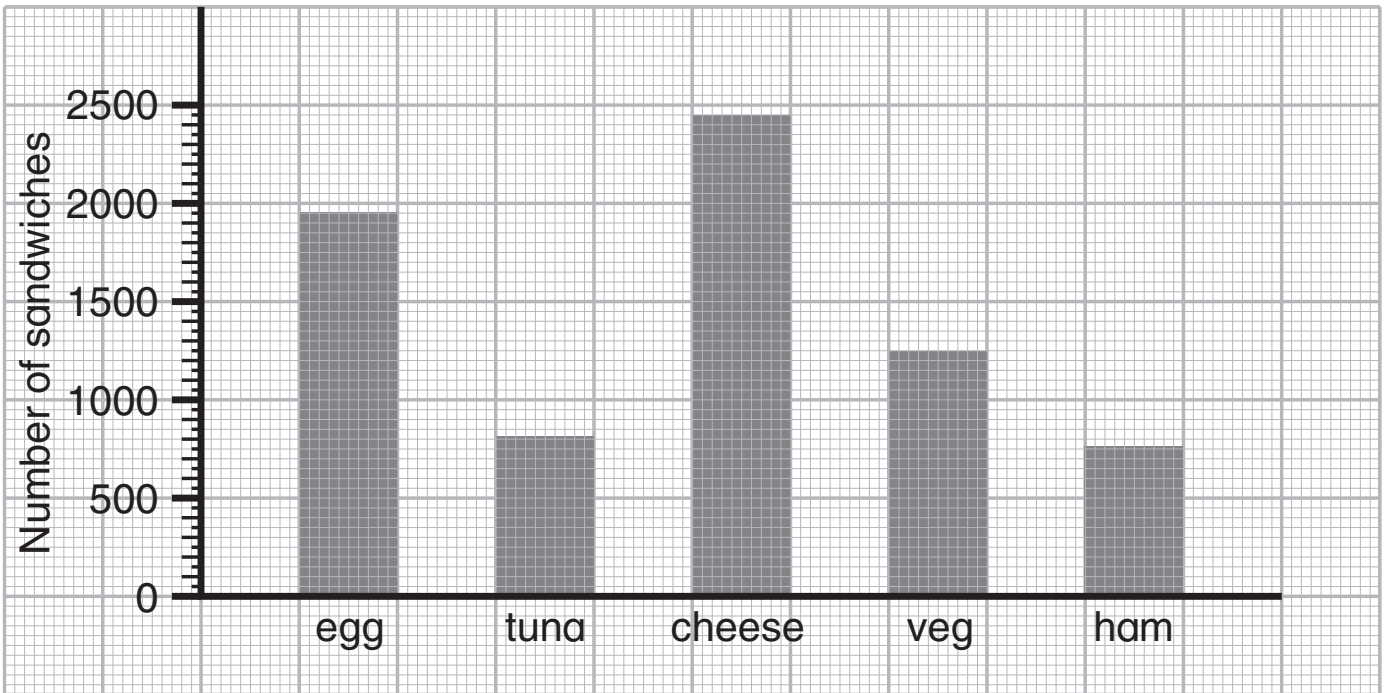
e Which whale is nearest to **double** the mass of the Bryde's whale?

Humpback

f Calculate **double** the mass of a Bryde's whale exactly.

30432Kg

Sandwich sales in March



This graph shows the number of sandwiches sold in 1 month for each filling. Each amount is rounded to the nearest 50 sandwiches. Use the graph to answer these.

a How many egg and tuna sandwiches were sold altogether?

2750

b How many veg and ham sandwiches were sold in total?

2000

c Which 2 types of filling together sold a total of 3200 sandwiches?

cheese and ham

d What is the total number of sandwiches sold of the 2 most popular fillings?

4400 (egg and cheese)

e How many more veg sandwiches were sold than tuna sandwiches?

450

f How many more of the most popular sandwich filling were sold than the least popular sandwich filling?

1700 (cheese minus ham)

g Which sandwich sold 1650 fewer than the number of cheese sandwiches sold?

tuna

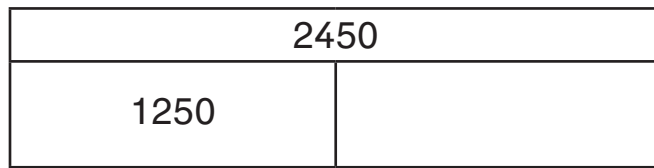
h In April 1450 more egg sandwiches were sold than in March. What was the total number of egg sandwiches sold in April?

3400



Use a bar model to show the difference between the following sandwich sales.

a Which 2 sandwiches are these?



cheese and *veg*

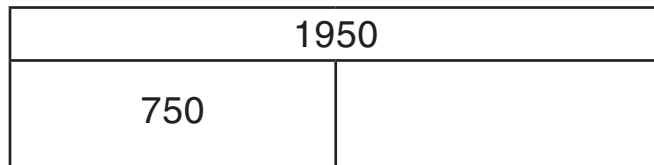
You can use an addition calculation to check your working.

$$\boxed{1250} + \boxed{1200} = \boxed{2450}$$

Find the difference. Then complete this statement:

cheese sandwiches sold 1200 more than *veg* sandwiches.

b Which 2 sandwiches are these?



egg and *ham*

You can use an addition calculation to check your working.

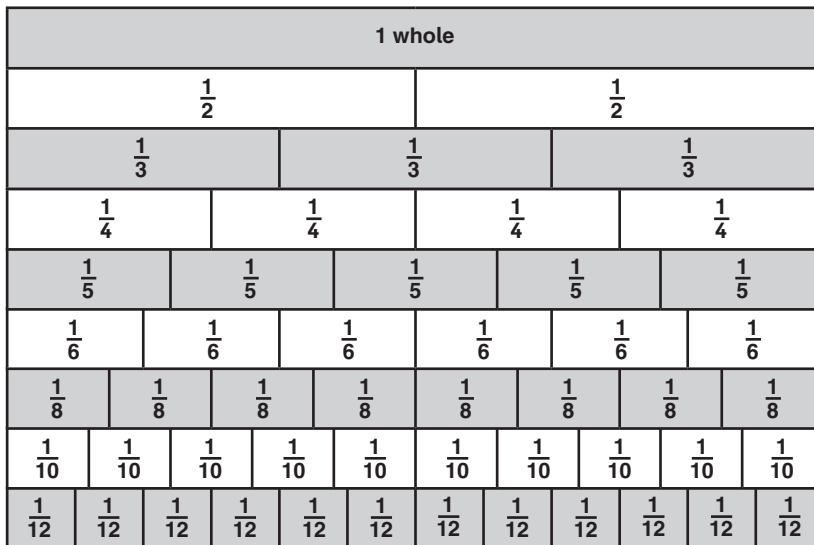
$$\boxed{750} + \boxed{1200} = \boxed{1950}$$

Find the difference. Then complete this statement:

egg sandwiches sold 1200 more than *veg* sandwiches.

7a Comparing and ordering fractions

Use this fraction wall to help you answer the questions.



1 Circle the **smallest** fraction in each set.

a

$\frac{1}{5}$	$\frac{1}{12}$
$\frac{1}{3}$	$\frac{1}{6}$

d

$\frac{1}{3}$	$\frac{1}{6}$
$\frac{1}{8}$	$\frac{1}{4}$

b

$\frac{1}{10}$	$\frac{1}{2}$
$\frac{1}{4}$	$\frac{1}{8}$

e

$\frac{1}{2}$	$\frac{1}{4}$
$\frac{1}{6}$	$\frac{1}{3}$

c

$\frac{1}{3}$	$\frac{1}{2}$
$\frac{1}{4}$	$\frac{1}{5}$

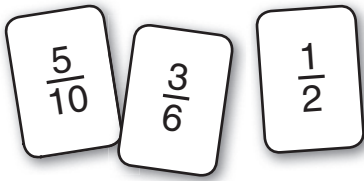
f

$\frac{1}{12}$	$\frac{1}{8}$
$\frac{1}{10}$	$\frac{1}{5}$

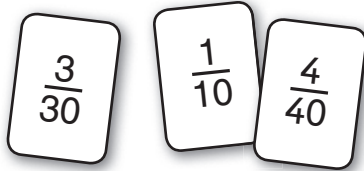


Write 2 more equivalent fractions in each family.

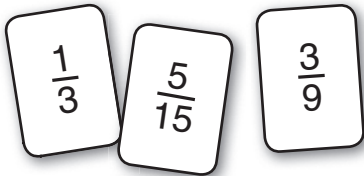
a



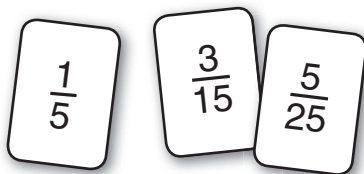
b



c



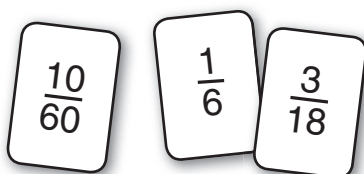
d



e



f



Check the fractions belong in each equivalent family.



Use the symbols $<$, $>$ or $=$ to compare these fractions.

a

$$\frac{3}{5} > \frac{1}{2}$$

d

$$\frac{1}{5} < \frac{5}{10}$$

g

$$\frac{5}{12} < \frac{1}{2}$$

b

$$\frac{1}{4} < \frac{4}{10}$$

e

$$\frac{1}{12} < \frac{3}{8}$$

h

$$\frac{2}{6} = \frac{1}{3}$$

c

$$\frac{1}{10} = \frac{3}{30}$$

f

$$\frac{6}{10} > \frac{1}{6}$$

i

$$\frac{1}{8} < \frac{2}{4}$$



Write your own fractions to make these **true**.

a $\frac{2}{3} > \square$

d $\frac{7}{12} > \square$

g $\frac{5}{6} > \square > \square$

b $\frac{9}{10} < \square$

e $\frac{1}{4} < \square < \square$

h $\frac{1}{8} < \square < \square$

c $\frac{1}{5} = \square$

f $\frac{1}{2} = \square = \square$

Check the fraction sentences are true.



Order these fractions from **smallest** to **largest**.

a

$\frac{2}{3}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{10}$
$\frac{1}{4}$	$\frac{3}{10}$	$\frac{1}{2}$	$\frac{2}{3}$

d

$\frac{1}{3}$	$\frac{9}{10}$	$\frac{3}{4}$	$\frac{1}{8}$
$\frac{1}{8}$	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{9}{10}$

b

$\frac{1}{8}$	$\frac{5}{6}$	$\frac{1}{12}$	$\frac{1}{3}$
$\frac{1}{12}$	$\frac{1}{8}$	$\frac{1}{3}$	$\frac{5}{6}$

e

$\frac{1}{4}$	$\frac{5}{6}$	$\frac{1}{5}$	$\frac{5}{12}$
$\frac{1}{5}$	$\frac{1}{4}$	$\frac{5}{12}$	$\frac{5}{6}$

c

$\frac{1}{10}$	$\frac{1}{2}$	$\frac{4}{5}$	$\frac{1}{6}$
$\frac{1}{10}$	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{4}{5}$

f

$\frac{1}{2}$	$\frac{1}{6}$	$\frac{3}{5}$	$\frac{7}{8}$
$\frac{1}{6}$	$\frac{1}{2}$	$\frac{3}{5}$	$\frac{7}{8}$



Read this statement:

'The smaller the denominator the larger the fraction.'

Is this statement ALWAYS, SOMETIMES or NEVER true? Circle your answer.

Show below how you can prove your answer is correct.

SOMETIMES true

7b Improper fractions and mixed numbers

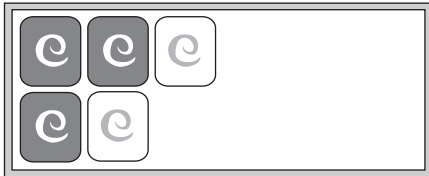


Look at the fraction of dark and light chocolates in each box.
Complete each fraction and write the total.



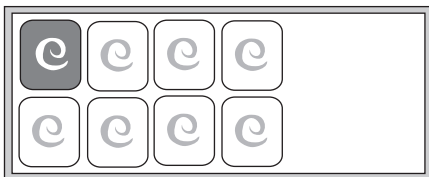
$$\frac{2}{3} + \frac{1}{3} = \frac{3}{3} = 1$$

a



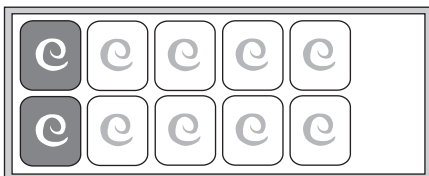
$$\frac{3}{5} + \frac{2}{5} = \frac{5}{5} = 1$$

b



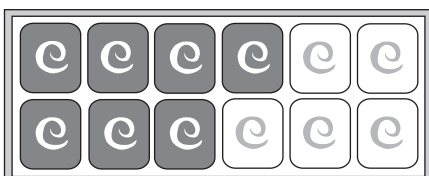
$$\frac{1}{8} + \frac{7}{8} = \frac{8}{8} = 1$$

c



$$\frac{2}{10} + \frac{8}{10} = \frac{10}{10} = 1$$

d



$$\frac{7}{12} + \frac{5}{12} = \frac{12}{12} = 1$$

e



$$\frac{2}{4} + \frac{2}{4} = \frac{4}{4} = 1$$

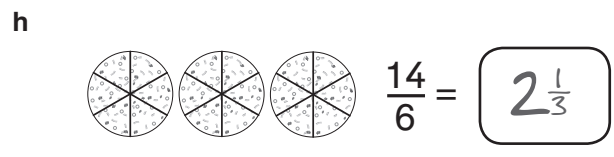
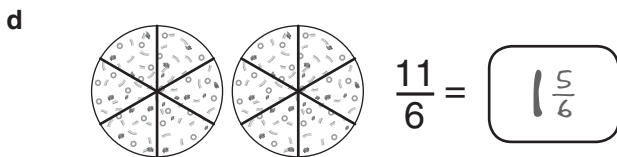
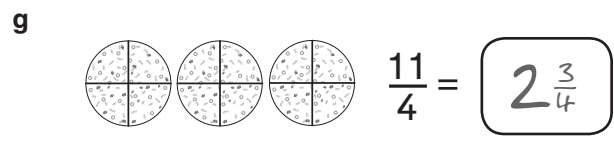
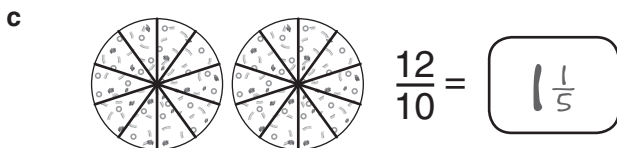
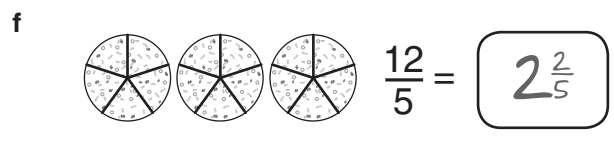
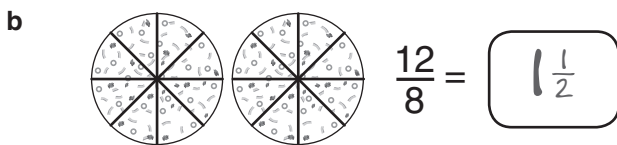
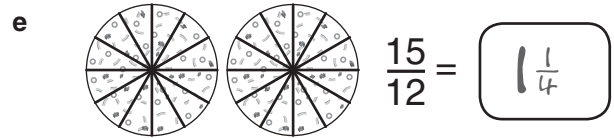
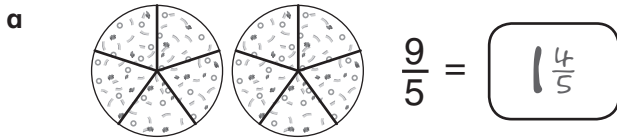
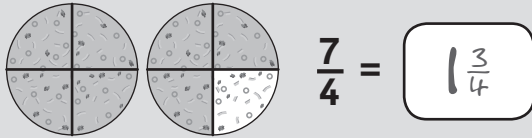
2

YOU WILL NEED:

- coloured crayons

Colour the pizza slices to show each fraction.

Write the improper fractions as mixed numbers.



3

Write these mixed numbers as improper fractions.

Change the whole number to a fraction as a first step.

$$2\frac{1}{5} = \frac{10}{5} + \frac{1}{5} = \frac{11}{5}$$

a

$$5\frac{1}{4} = \frac{20}{4} + \frac{1}{4} = \frac{21}{4}$$

e

$$2\frac{3}{4} = \frac{8}{4} + \frac{3}{4} = \frac{11}{4}$$

b

$$1\frac{2}{3} = \frac{3}{3} + \frac{2}{3} = \frac{5}{3}$$

f

$$4\frac{7}{10} = \frac{40}{10} + \frac{7}{10} = \frac{47}{10}$$

c

$$6\frac{1}{6} = \frac{36}{6} + \frac{1}{6} = \frac{37}{6}$$

g

$$11\frac{1}{3} = \frac{33}{3} + \frac{1}{3} = \frac{34}{3}$$

d

$$3\frac{2}{5} = \frac{15}{5} + \frac{2}{5} = \frac{17}{5}$$

h

$$5\frac{7}{8} = \frac{40}{8} + \frac{7}{8} = \frac{47}{8}$$



Add these fractions. Write your answers as an improper fraction. Then write them as a mixed number. Simplify if possible.

$$\frac{3}{5} + \frac{2}{5} + \frac{1}{5} = \frac{6}{5} = 1\frac{1}{5}$$

a $\frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{9}{4} = 2\frac{1}{4}$

d $\frac{9}{10} + \frac{3}{10} + \frac{7}{10} = \frac{19}{10} = 1\frac{9}{10}$

b $\frac{2}{7} + \frac{2}{7} + \frac{3}{7} = \frac{7}{7} = 1$

e $\frac{5}{6} + \frac{5}{6} + \frac{5}{6} = \frac{15}{6} = 2\frac{1}{2}$

c $\frac{3}{8} + \frac{7}{8} + \frac{3}{8} = \frac{13}{8} = 1\frac{5}{8}$

f $\frac{7}{8} + \frac{5}{8} + \frac{3}{8} = \frac{15}{8} = 1\frac{7}{8}$



Write the equivalent measures as improper fractions.

$$6 \text{ kg } 750 \text{ g} = \frac{6750}{1000}$$

$$4 \text{ m } 85 \text{ cm} = \frac{485}{100}$$

a $8 \text{ m } 35 \text{ cm} = \frac{835}{100}$

d $4 \text{ km } 662 \text{ m} = \frac{4662}{1000}$

b $2 \text{ l } 910 \text{ ml} = \frac{2910}{1000}$

e $7 \text{ kg } 118 \text{ g} = \frac{7118}{1000}$

c $5 \text{ kg } 475 \text{ g} = \frac{5475}{1000}$

f $3 \text{ m } 87 \text{ cm} = \frac{387}{100}$



Answer these.

a A large jug of drink is made from $\frac{3}{4}$ litre of juice and $1\frac{1}{2}$ litres of water. How much drink is in the jug altogether?

$$2\frac{1}{4} \text{ litres}$$

b 2 curtains cover a window exactly. Each curtain is $\frac{7}{10}$ m wide. How wide is the window?

$$1\frac{2}{5} (1.4 \text{ m})$$

c A group of friends eat $\frac{3}{4}$ of a whole melon. They then use $\frac{3}{4}$ of another whole melon to make a smoothie drink. What fraction of a whole melon is left?

$$\frac{1}{2}$$

d Bars of chocolate are divided into 8 chunks. Hannah used $3\frac{3}{4}$ bars of chocolate in a recipe. How many chunks did she use in total?

$$30$$

1 Reduce these to the simplest equivalent fractions.

$$a \quad \frac{8}{10} = \frac{4}{5}$$

$$d \quad \frac{10}{25} = \frac{2}{5}$$

$$g \quad \frac{500}{1000} = \frac{1}{2}$$

$$b \quad \frac{9}{12} = \frac{3}{4}$$

$$e \quad \frac{250}{1000} = \frac{1}{4}$$

$$h \quad \frac{44}{100} = \frac{11}{25}$$

$$c \quad \frac{35}{100} = \frac{7}{20}$$

$$f \quad \frac{2}{8} = \frac{1}{4}$$

$$i \quad \frac{6}{10} = \frac{3}{5}$$

2 Write these decimals as fractions. Reduce them if possible.

$$a \quad 0.6 = \frac{3}{5}$$

$$e \quad 0.75 = \frac{3}{4}$$

$$i \quad 0.507 = \frac{507}{1000}$$

$$b \quad 0.3 = \frac{3}{10}$$

$$f \quad 0.04 = \frac{1}{25}$$

$$j \quad 0.435 = \frac{87}{200}$$

$$c \quad 0.8 = \frac{4}{5}$$

$$g \quad 0.93 = \frac{93}{100}$$

$$k \quad 0.118 = \frac{59}{500}$$

$$d \quad 0.5 = \frac{1}{2}$$

$$h \quad 0.32 = \frac{16}{50} \text{ or } \frac{8}{25}$$

$$l \quad 0.016 = \frac{4}{250}$$

3 Write these fractions as decimals.

$$a \quad 4\frac{7}{10} = 4.7$$

$$d \quad 35\frac{42}{100} = 35.42$$

$$g \quad 20\frac{353}{1000} = 20.353$$

$$b \quad 13\frac{1}{10} = 13.1$$

$$e \quad 8\frac{4}{100} = 8.04$$

$$h \quad 1\frac{61}{1000} = 1.061$$

$$c \quad 9\frac{59}{100} = 9.59$$

$$f \quad 6\frac{807}{1000} = 6.807$$

$$i \quad 14\frac{9}{1000} = 14.009$$



Write these decimals as fractions. Reduce them if possible.

a $5.4 = 5\frac{2}{5}$

d $10.75 = 10\frac{3}{4}$

g $9.235 = 9\frac{47}{200}$

b $33.5 = 33\frac{1}{2}$

e $7.02 = 7\frac{1}{50}$

h $2.016 = 2\frac{4}{250}$

c $8.64 = 8\frac{16}{25}$

f $14.239 = 14\frac{239}{1000}$

i $17.006 = 17\frac{3}{500}$



Convert these measurements to decimals.

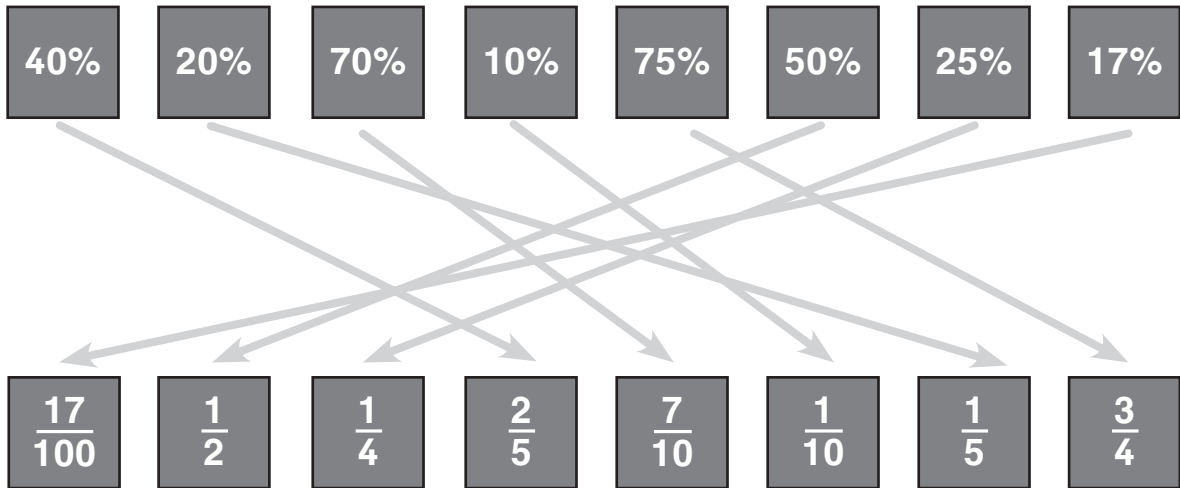
4 m 45 cm	→	4.45	m
16 m 3 cm	→	16.03	m
8 km 912 m	→	8.912	km
10 km 55 m	→	10.055	km
7 cm 6 mm	→	7.6	cm
13 cm 1 mm	→	13.1	cm

6 kg 329 g	→	6.329	kg
5 kg 850 g	→	5.85	kg
11 kg 94 g	→	11.094	kg
26 kg 7g	→	26.007	kg

7 l 386 ml	→	7.386	l
32 l 400 ml	→	32.4	l
4 l 25 ml	→	4.025	l
15 l 90 ml	→	15.09	l



Draw lines to match the percentages and fractions.



Write these percentages as fractions. Reduce them to their lowest equivalent value.

$$35\% = \frac{35}{100} = \frac{7}{20}$$

a $90\% = \frac{90}{100} = \frac{9}{10}$

e $42\% = \frac{42}{100} = \frac{21}{50}$

b $37\% = \frac{37}{100} = \frac{37}{100}$

f $75\% = \frac{75}{100} = \frac{3}{4}$

c $60\% = \frac{60}{100} = \frac{3}{5}$

g $15\% = \frac{15}{100} = \frac{3}{20}$

d $55\% = \frac{55}{100} = \frac{11}{20}$

h $8\% = \frac{8}{100} = \frac{2}{25}$



Complete this table.

	10%	5%	20%	1%	2%
£30	£3	£1.50	£6	30p	60p
£70	£7	£3.50	£14	70p	£1.40
£250	£25	£12.50	£50	£2.50	£5
£320	£32	£16	£64	£3.20	£6.40
£490	£49	£24.50	£98	£4.90	£9.80
£1200	£120	£60	£240	£12	£24



Complete these.

a $\frac{1}{5} = 0.2 = 20\%$

f $\frac{7}{10} = 0.7 = 70\%$

b $\frac{3}{10} = 0.3 = 30\%$

g $\frac{3}{4} = 0.75 = 75\%$

c $\frac{1}{4} = 0.25 = 25\%$

h $\frac{1}{10} = 0.1 = 10\%$

d $\frac{1}{2} = 0.5 = 50\%$

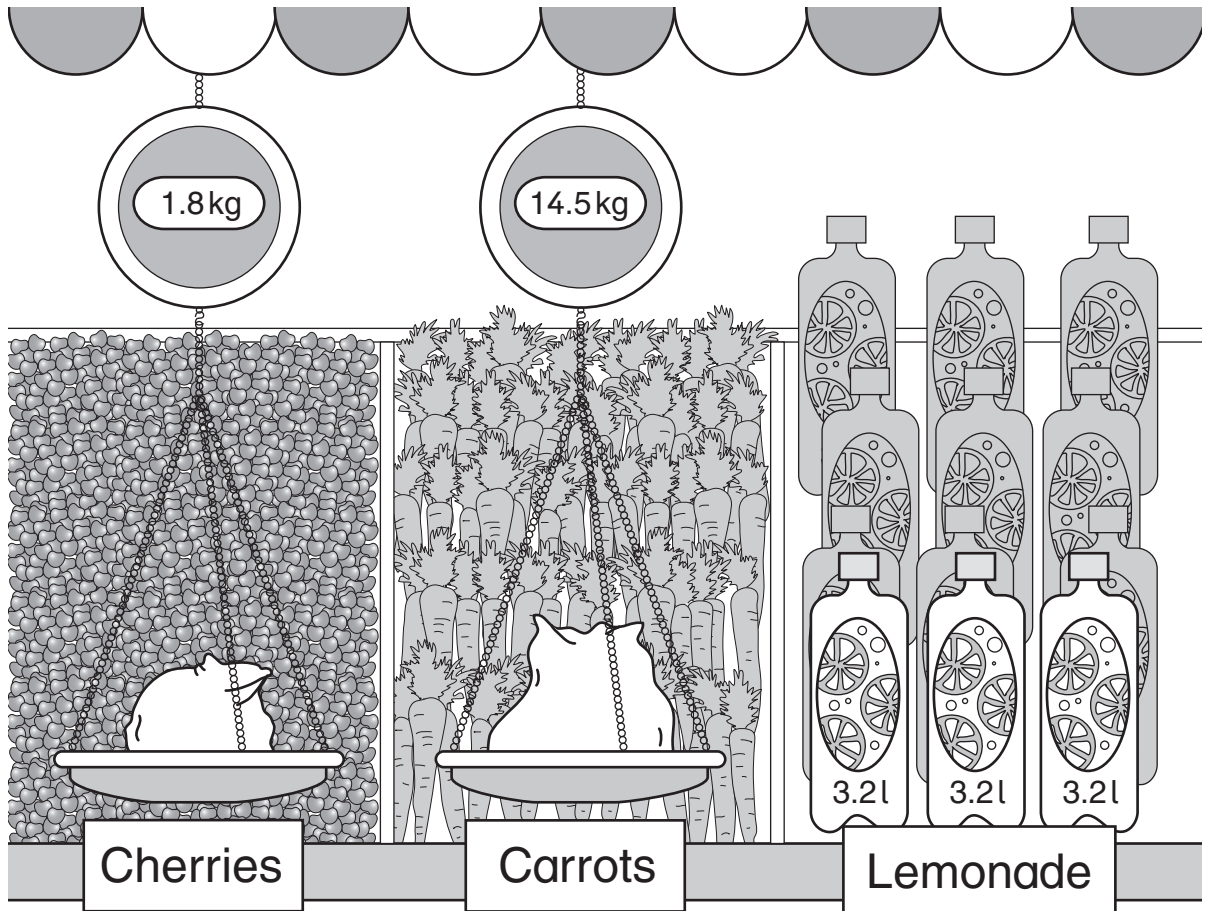
i $\frac{4}{5} = 0.8 = 80\%$

e $\frac{3}{5} = 0.6 = 60\%$

j $\frac{2}{5} = 0.4 = 40\%$

5

Answer these.



a What is 10% of 14.5kg?

1.45kg

b What is 50% of 1.8kg?

0.9kg

c What is 25% of 3.2litres?

0.8l

d What is 20% of 1.8kg?

0.36kg

e What is 1% of 14.5kg?

0.145kg

f What is 5% of 3.2litres?

0.16l



Show 3 different methods you could use to work out 15% of £180.

£27

Check three different and correct methods are used.

8a Primes, squares and cubes

1

Colour the **square numbers** on this multiplication grid.

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	64	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

2

Write the factors of each of the square numbers coloured above.

Some have been done for you as examples.

1 → 1

4 → 1, 2, 4

9 → 1, 3, 9

16 → 1, 2, 4, 8, 16

25 → 1, 5, 25

36 → 1, 2, 3, 4, 6, 9,
12, 18, 36

49 → 1, 7, 49

64 → 1, 2, 4, 8, 16, 32, 64

81 → 1, 3, 9, 27, 81

100 → 1, 2, 4, 5, 10, 20, 25, 50, 100

121 → 1, 11, 121

144 → 1, 2, 3, 4, 6, 8, 12, 18, 24,
36, 48, 72, 144



Count the number of factors for each square number. What do you notice?

Square numbers always have an number of factors.



Answer these.

a $3^2 = 3 \times 3 =$

f $9^2 = 9 \times 9 =$

b $5^2 = 5 \times 5 =$

g $2^2 = 2 \times 2 =$

c $10^2 = 10 \times 10 =$

h $7^2 = 7 \times 7 =$

d $4^2 = 4 \times 4 =$

i $11^2 = 11 \times 11 =$

e $8^2 = 8 \times 8 =$

j $6^2 = 6 \times 6 =$



Answer these.

a $2^3 = 2 \times 2 \times 2 =$

b $10^3 = 10 \times 10 \times 10 =$

c $3^3 = 3 \times 3 \times 3 =$

d $4^3 = 4 \times 4 \times 4 =$

e $1^3 = 1 \times 1 \times 1 =$

f $7^3 = 7 \times 7 \times 7 =$

g $6^3 = 6 \times 6 \times 6 =$

h $5^3 = 5 \times 5 \times 5 =$



Use the method that the Ancient Greek mathematician Eratosthenes used to find prime numbers less than 100:

- Cross out 1.
- Cross out all the multiples of 2, but not 2.
- Cross out all the multiples of 3, but not 3.
- Cross out all the multiples of 5, but not 5.
- Cross out all the multiples of 7, but not 7.
- Circle all the numbers you have left uncrossed on the number square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100


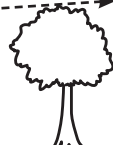



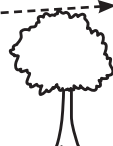
From your number square, write the list of prime numbers to 100 in order.


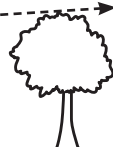
2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47,
53, 59, 61, 67, 71, 73, 79, 83, 89, 97



1



Calculate the heights of the tall trees.



a  285 cm → 5 times taller →  1425 cm

b  3 m 70 cm → 3 times taller →  11m 10 cm

c  1 m 42 cm → 6 times taller →  8m 52 cm

d  693 cm → 2 times taller →  1386 cm

e  740 cm → 4 times taller →  2960 cm

f  2 m 38 cm → 10 times taller →  23m 80 cm

2

Scale these down by the amounts shown.

a



one fifth of a bottle

0.7 l

d



one sixth of a can

1.3 l

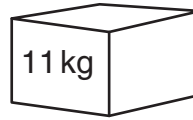
b



one quarter of a sack

1.8 kg

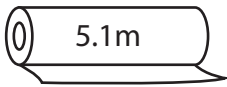
e



one tenth of a box

1.1 kg

c



one third of a roll

1.7 m

f



one eighth of a parcel

0.5 kg

3

Answer these by finding 1% and then multiplying.

8% of 480 kg?

$$1\% \text{ of } 480 \text{ kg} = 480 \div 100 = 4.8 \quad 4.8 \times 8 = 38.4 \text{ kg}$$

a

4% of 560 m =

22.4 m

b

3% of 910 l =

27.3 l

c

2% of 477 kg =

9.54 kg

d

6% of 840 km =

50.4 km

e

9% of 125 l =

11.25 l

f

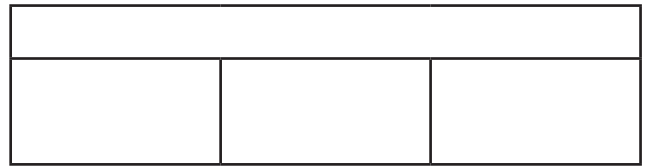
7% of 390 kg =

27.3 kg



Answer these.

Draw a bar model to help you.



- a Lucy ordered a large pizza weighing 480 g. She could only eat one third of it. How much pizza did she eat? Give your answer in grams.
- b An ice-cream van sold 73 ice-creams on Saturday. It sold 5 times more ice-creams on Sunday. How many ice-creams were sold on Sunday?
- c This year Tom is a one seventh of the age of his Grandad. His Grandad is 91 years old. How old is Tom?
- d There 576 pages in a book. Gita has read one quarter of the book. How many pages has Gita read?
- e Emma is 1 m 45 cm tall. The average height of a giraffe is 4 times taller than Emma. What is the average height of a giraffe?
- f The fastest humans run at 23.4 mph (mph = miles per hour). Cheetahs can run 3 times as fast as this. How fast can cheetahs run?

160 g

365

13

144

5.8 m

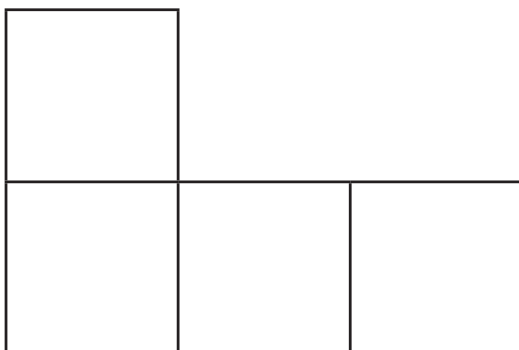
70.2 mph



Draw pictures in the grid to help you answer this.

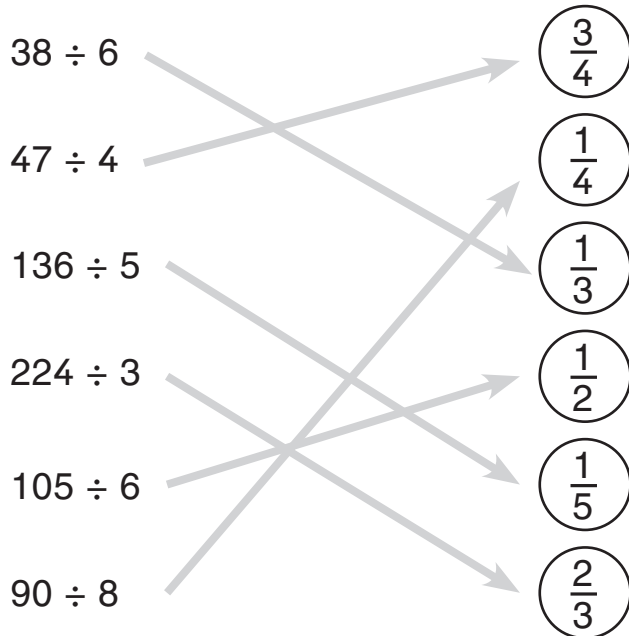
Ali has some stickers. Jon has 3 times as many.
He gave 8 stickers to Ali so they have the same amount.
How many stickers did they have altogether?

32





Work out the calculation. Join it to its fraction remainder.



Answer these. Write the remainders as fractions.

a $34 \frac{1}{4}$
 $4 \overline{) 137}$

d $98 \frac{3}{4}$
 $8 \overline{) 790}$

g $222 \frac{2}{3}$
 $6 \overline{) 1336}$

b $146 \frac{1}{5}$
 $5 \overline{) 731}$

e $540 \frac{1}{3}$
 $6 \overline{) 3242}$

h $311 \frac{3}{4}$
 $4 \overline{) 1247}$

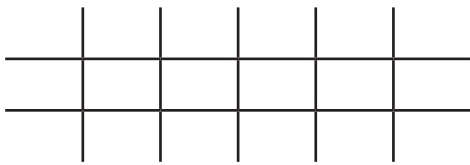

c $35 \frac{1}{2}$
 $8 \overline{) 284}$

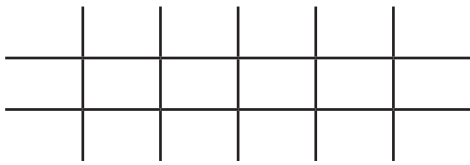

f $217 \frac{4}{5}$
 $5 \overline{) 1089}$

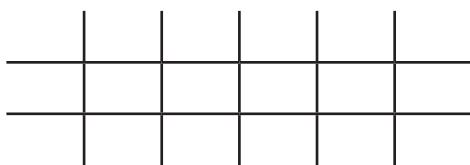

i $745 \frac{1}{2}$
 $8 \overline{) 5964}$





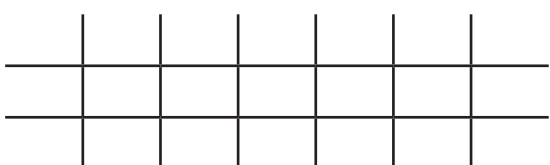

Use the grid method and then the long multiplication method to answer each of these. Colour the smiley face of the method you prefer for each question.

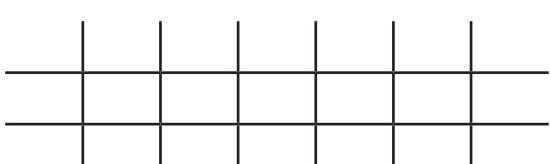

a 483×26  


b 697×34  


c 556×53  


d 1709×15  


e 2348×19  


f 4094×28  


a
$$\begin{array}{r} 483 \\ \times 26 \\ \hline \end{array}$$
 
12558

c
$$\begin{array}{r} 556 \\ \times 53 \\ \hline \end{array}$$
 
29468

e
$$\begin{array}{r} 2348 \\ \times 19 \\ \hline \end{array}$$
 
44612

b
$$\begin{array}{r} 697 \\ \times 34 \\ \hline \end{array}$$
 
23698

d
$$\begin{array}{r} 1709 \\ \times 15 \\ \hline \end{array}$$
 
25635

f
$$\begin{array}{r} 4094 \\ \times 28 \\ \hline \end{array}$$
 
114632

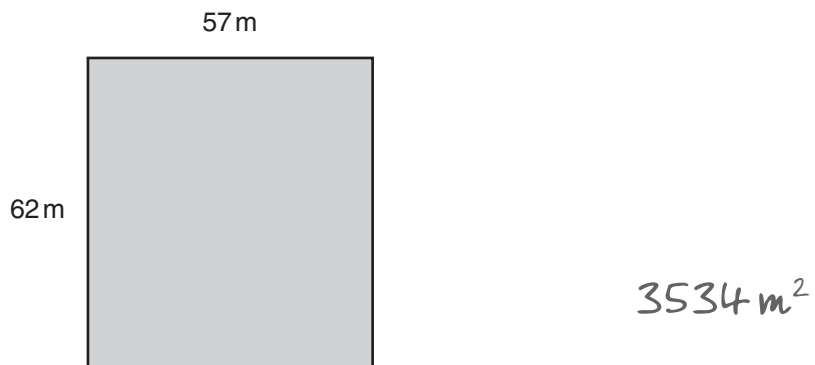


Calculate the area of each field. Use the long multiplication method.

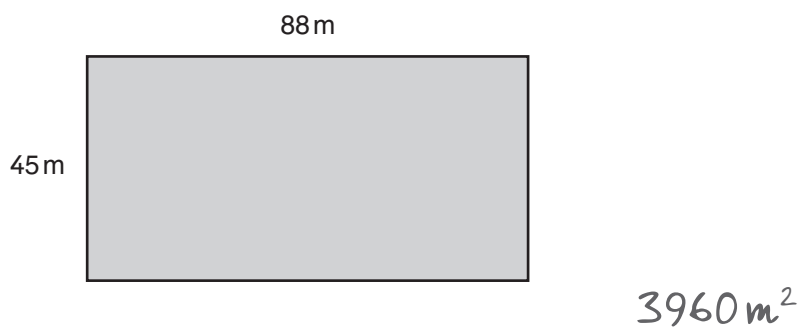
a



b



c



d

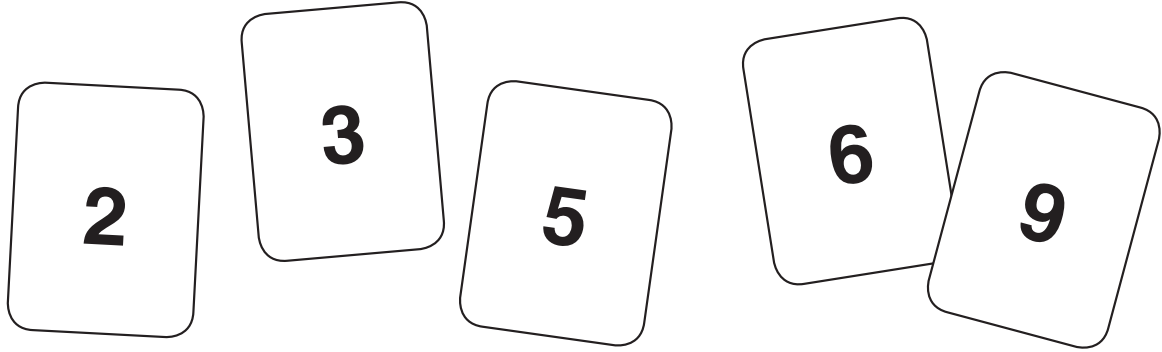


5

YOU WILL NEED:

- digit cards 2, 3, 5, 6, 9

Arrange the digit cards to make a division.



--	--	--	--	--

- a Do the calculation. Record the fraction remainder in the box below.
- b Do this with different arrangements of the digit cards.
- c Can you predict the fraction remainder?

Fraction remainders

Check answers and methods for predicting the remainder.

9a Reflecting and translating 2-D shapes

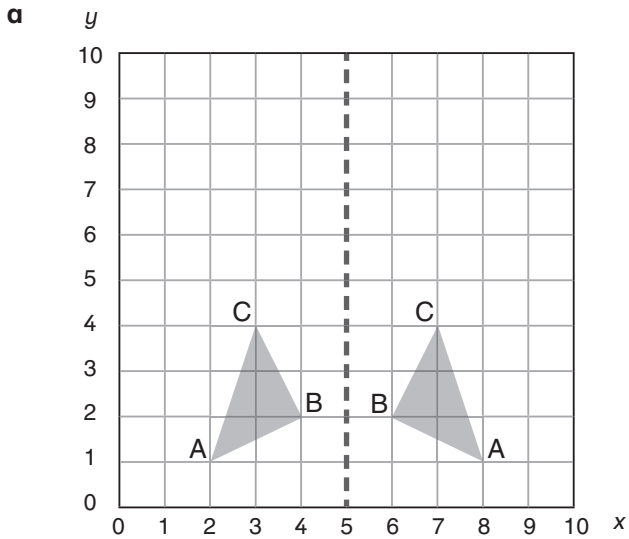
1

YOU WILL NEED:

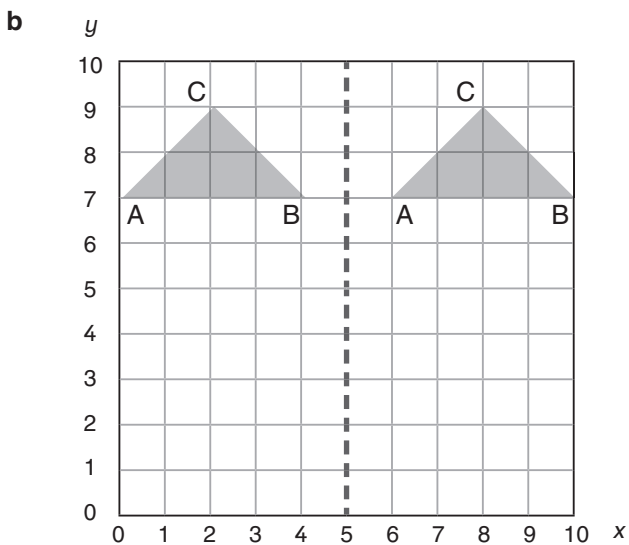
- ruler

Write the coordinates of each triangle (ABC).

Draw a reflection of each triangle. Write the coordinates of its reflection.

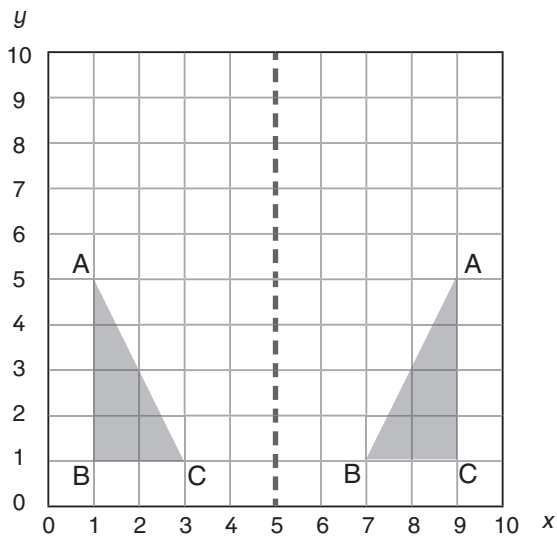


Triangle		Reflection
A	(2, 1)	→ (8, 1)
B	(4, 2)	→ (6, 2)
C	(3, 4)	→ (7, 4)

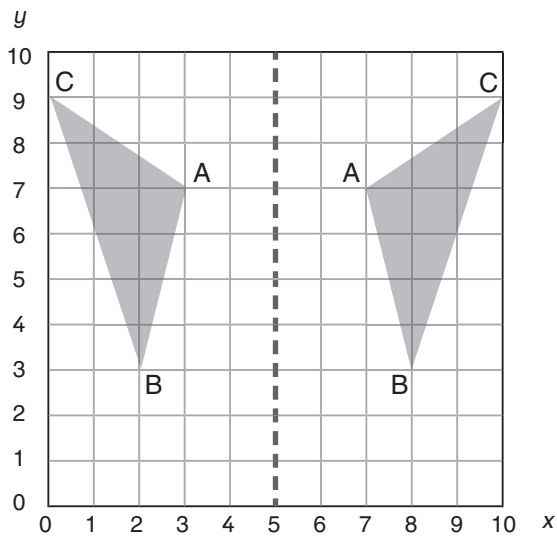


Triangle		Reflection
A	(6, 7)	→ (4, 7)
B	(10, 7)	→ (0, 7)
C	(8, 9)	→ (2, 9)

c



Triangle		Reflection
A	$(1, 5)$	$(9, 5)$
B	$(1, 1)$	$(9, 1)$
C	$(3, 1)$	$(7, 1)$



Triangle		Reflection
A	$(7, 7)$	$(3, 7)$
B	$(8, 3)$	$(2, 3)$
C	$(10, 9)$	$(0, 9)$

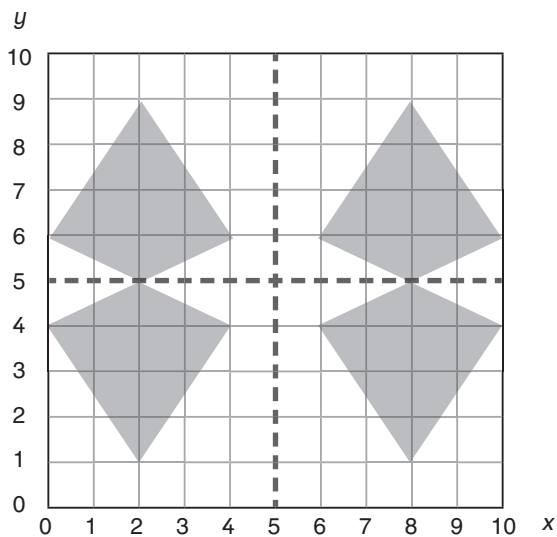


YOU WILL NEED:

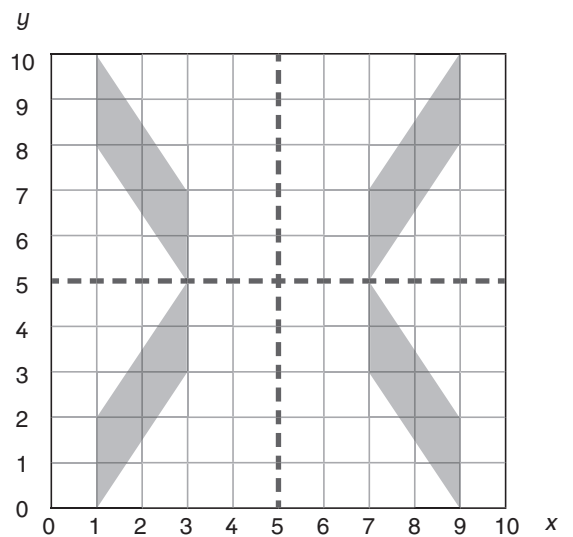
- ruler

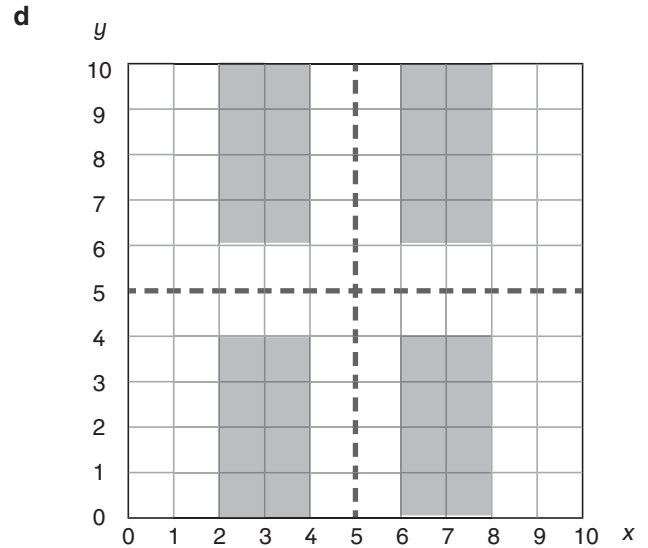
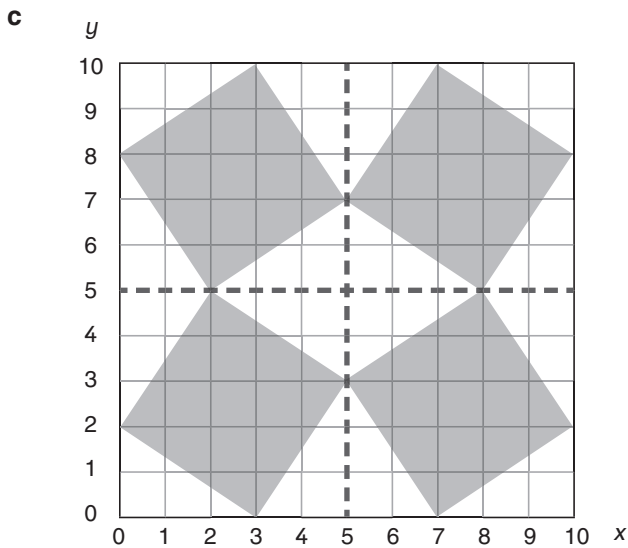
Draw reflections of these quadrilaterals so there is a shape in each of the four sections.

a



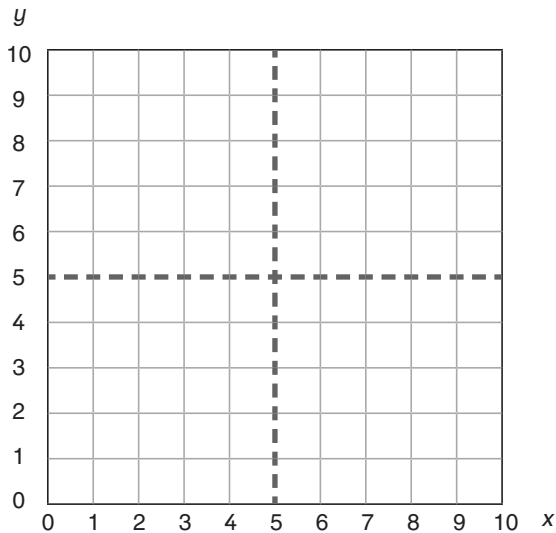
b





3

Design your own pattern. Draw a shape on the grid. Then reflect it so you have a total of four shapes.



Check four correctly reflected shapes have been drawn, and coordinates entered in question 4.

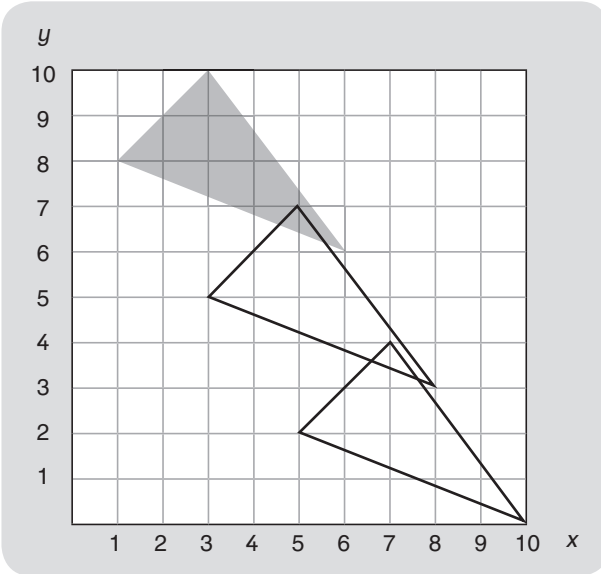
4

Label your four shapes in question 3 A, B, C and D. Write the coordinates for the vertices of each shape. Write more brackets if you need them.

Shape	Coordinates		
A	(,)	(,)	(,)
B	(,)	(,)	(,)
C	(,)	(,)	(,)
D	(,)	(,)	(,)

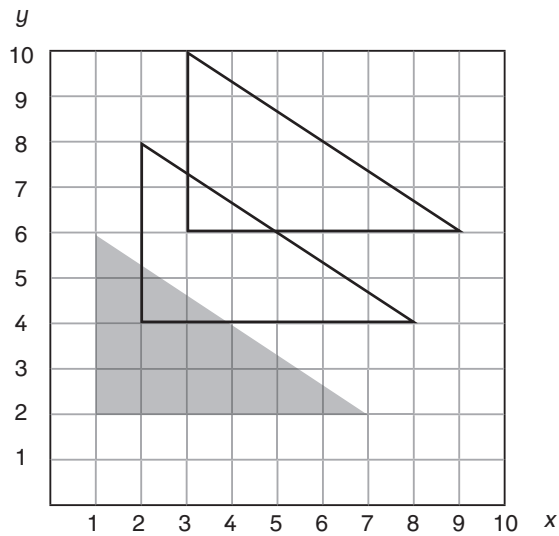
5

This triangle has made a translation pattern by being repeated 2 squares right and 3 squares down each time.



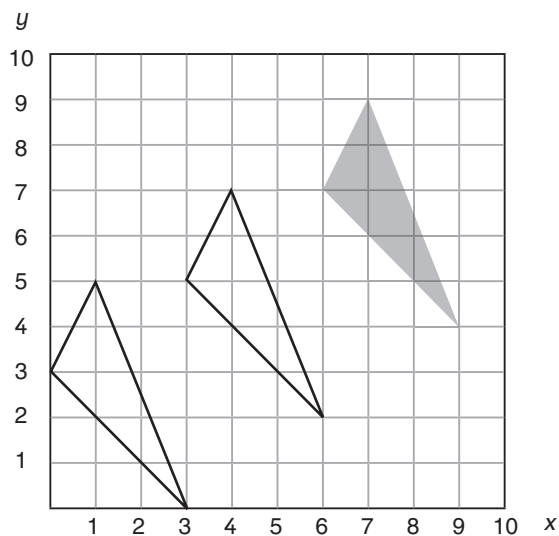
Describe each of these translations.

a



1 square right,
2 squares up

b

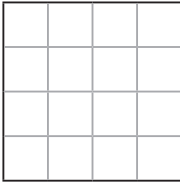


3 squares left,
2 squares down



Design a wallpaper pattern using a translation of a single shape.

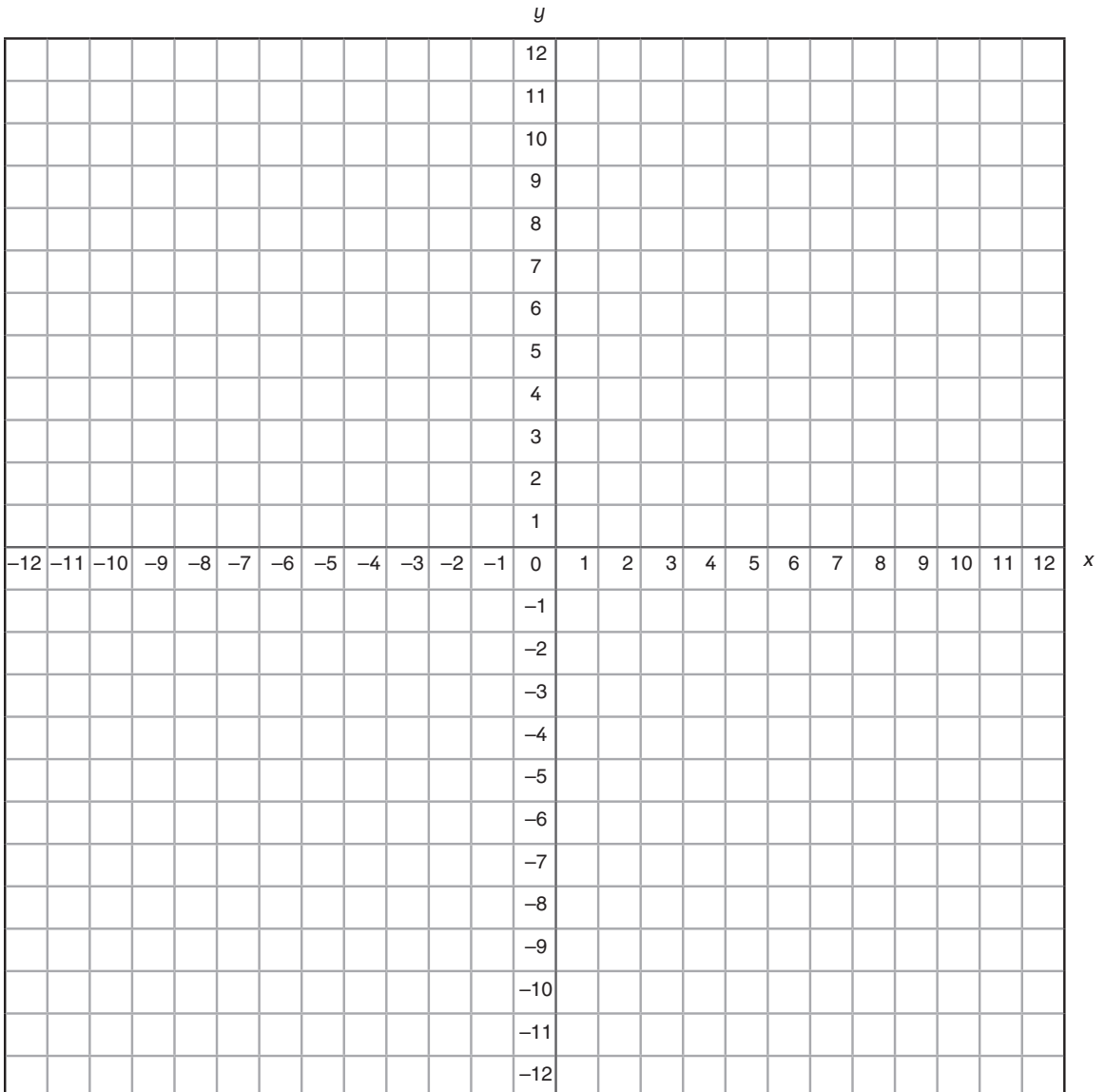
- Draw your first shape on this grid.



- Now choose your translation. It can be up, down, left or right a number of squares.

Check shape and translation.

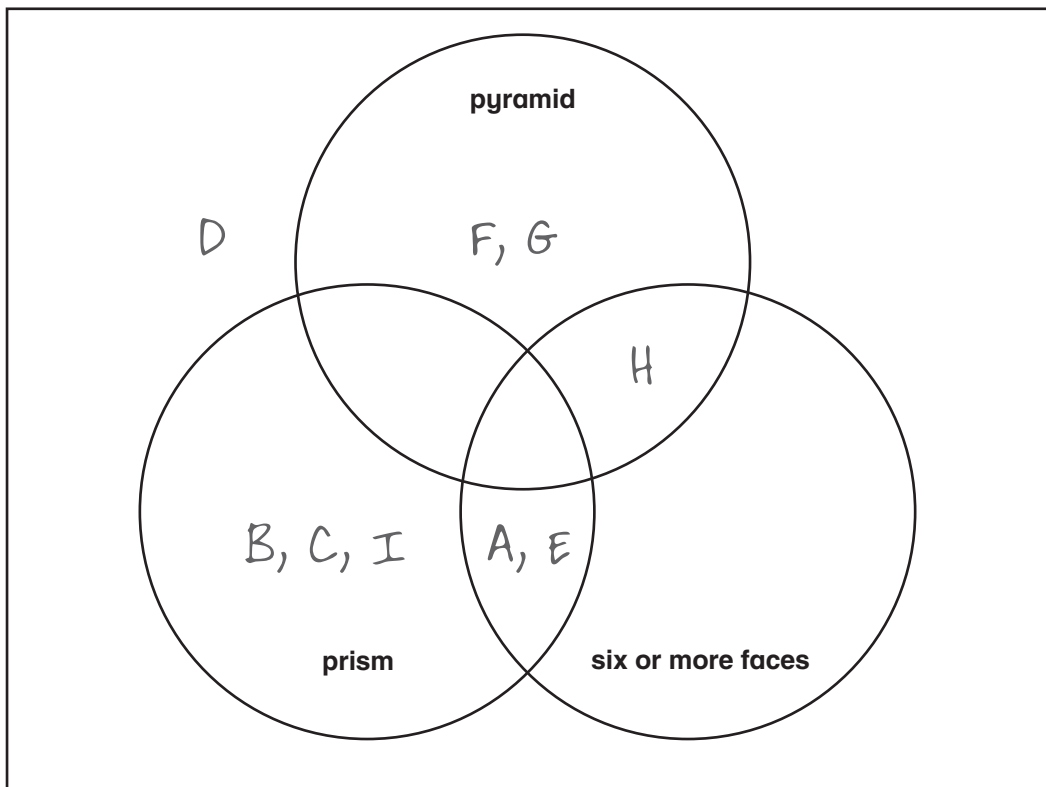
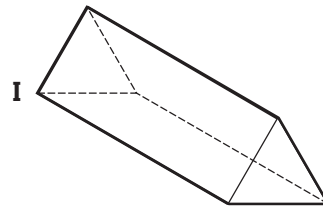
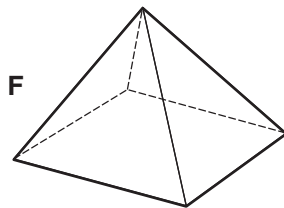
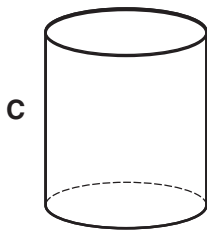
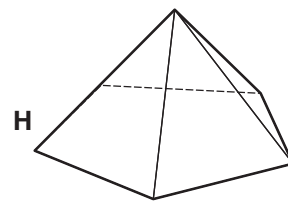
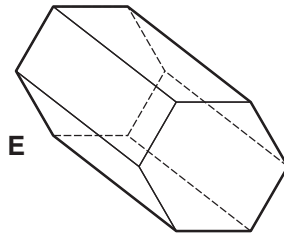
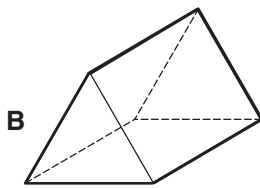
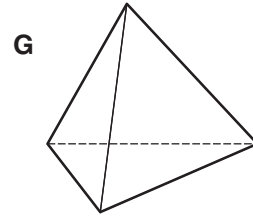
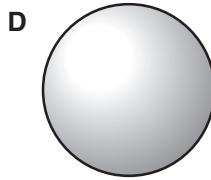
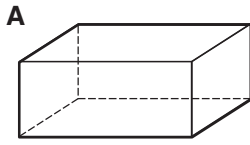
- Show your design on this grid.



9b Identifying 3-D shapes

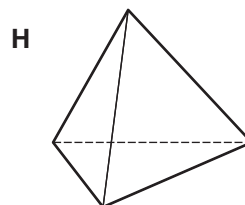
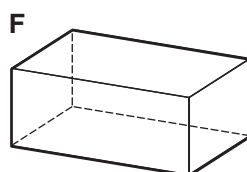
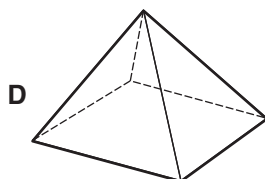
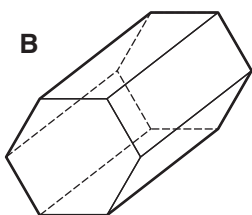
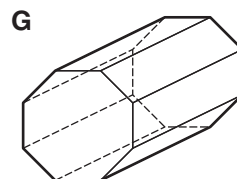
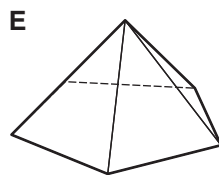
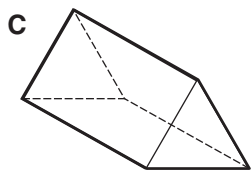
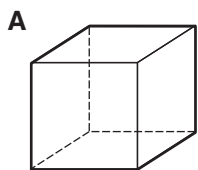
1

Sort these shapes. Write the letters for each shape in the correct area of the Venn diagram.



2

a Name each of these shapes. Record the number of faces, vertices and edges.



Name of shape	Number of faces	Number of vertices	Number of edges
A cube	6	8	12
B hexagonal prism	8	12	18
C triangular prism	5	6	9
D square-based pyramid	5	5	8
E pentagonal pyramid	6	6	10
F cuboid	6	8	12
G octagonal prism	8	12	18
H tetrahedron	4	4	6

b What do you notice about the number of faces, vertices and edges?

faces + vertices - 2 = number of edges
 Check other things noticed apply to all the shapes or types of shapes.

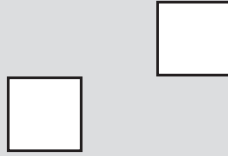
3

Here is a method to draw a cuboid.

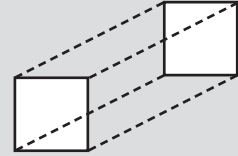
• Draw a square.



• Draw another square.



• Join the vertices.



Draw these shapes using the same technique.

cube

triangular prism

pentagonal prism

Check the shapes are accurately drawn.

4

YOU WILL NEED:

- straws cut into two different lengths

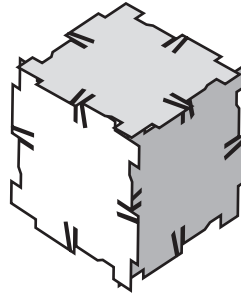
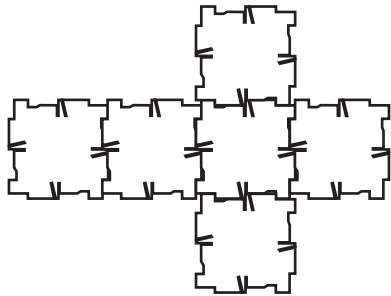
Make and then sketch the polyhedra you could make with different numbers of straws of two different lengths.

<p>a</p>	<p>square-based pyramid</p>	<p>c</p>	<p>triangular prism</p>
<p>b</p>	<p>cube</p>	<p>d</p>	<p>cuboid</p>

5

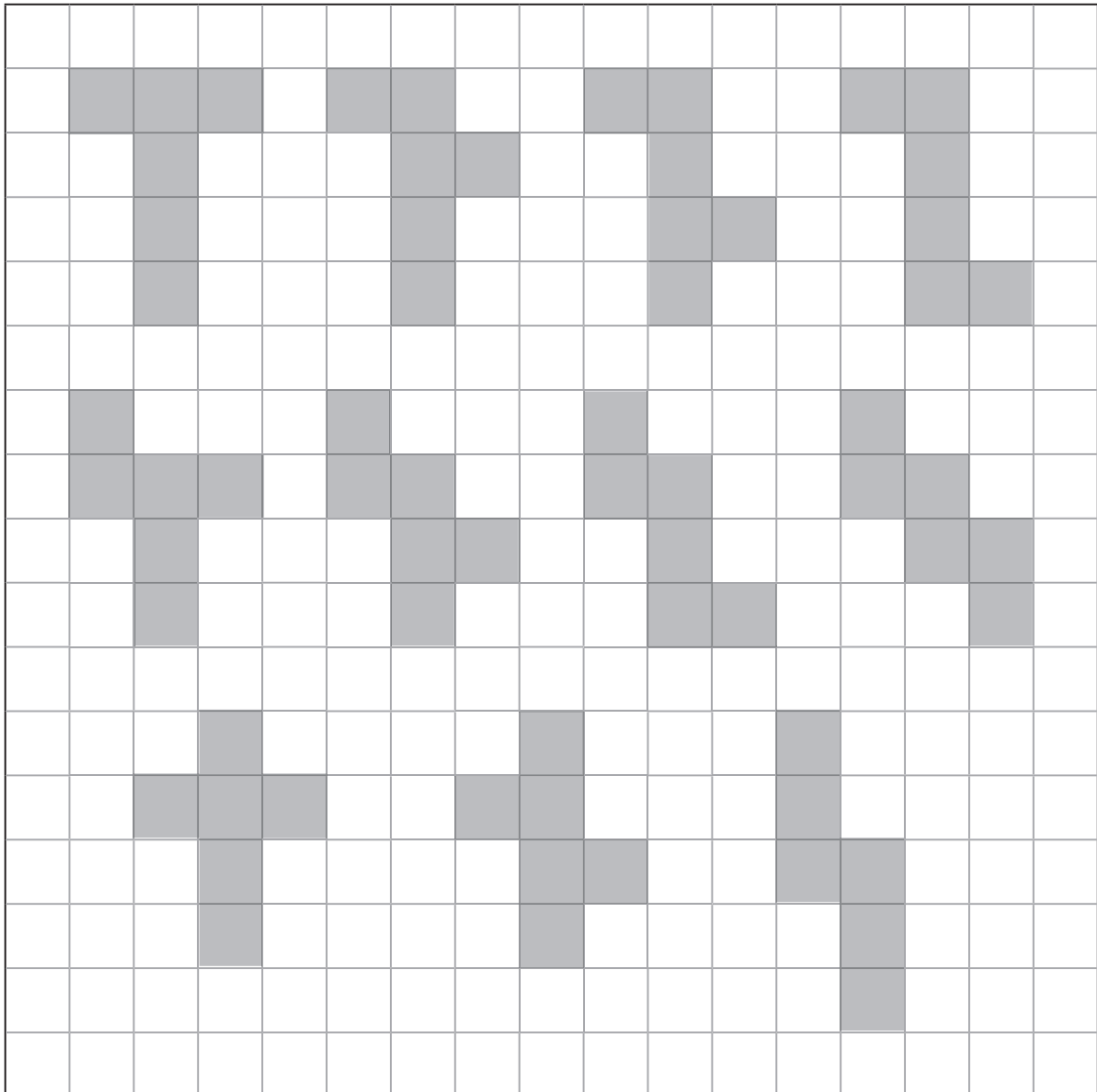
YOU WILL NEED:
• interlocking cubes (e.g. Clix[®])

This is the net of a cube.
Make this net with interlocking cubes.
Fold it up into a cube.



Now carefully unfold it to make a different net.
Draw the new net on this grid.
Repeat for other nets of the cube and draw them on the grid.

*Check nets
correctly drawn.*



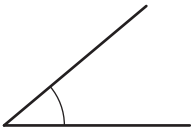
1

YOU WILL NEED:

- protractor

Use a protractor to measure these angles.

a



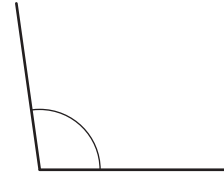
40°

c



15°

e



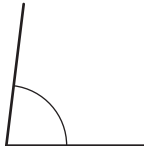
98°

b



175°

d



83°

f



136°

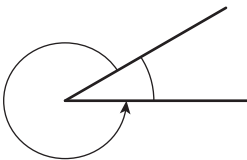
2

Calculate these reflex angles.



$$360^\circ - 45^\circ = 315^\circ$$

a



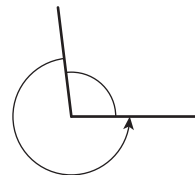
330°

c



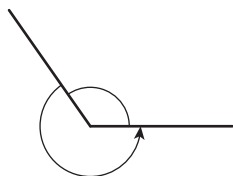
190°

e



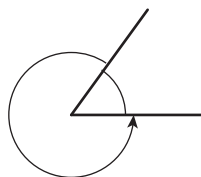
263°

b



235°

d



306°

f



198°

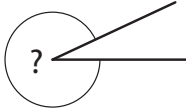
3

YOU WILL NEED:

- protractor

Measure these with a protractor. Record the angles and the reflex angles.

a



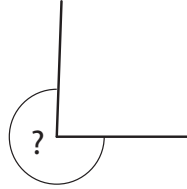
Angle:

25°

Reflex angle:

335°

c



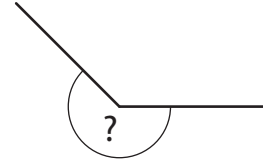
Angle:

88°

Reflex angle:

272°

e



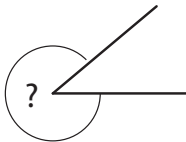
Angle:

135°

Reflex angle:

225°

b



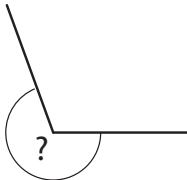
Angle:

40°

Reflex angle:

320°

d



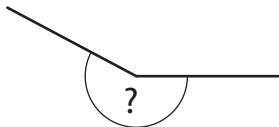
Angle:

110°

Reflex angle:

250°

f



Angle:

152°

Reflex angle:

208°

4

YOU WILL NEED:

- compasses
- ruler and pencil

Use compasses and a ruler to construct each triangle.

a

equilateral triangle with sides of 4.5 cm

c

equilateral triangle with sides of 54 mm

b

isosceles triangle with a base of 3 cm and two sides of 6 cm

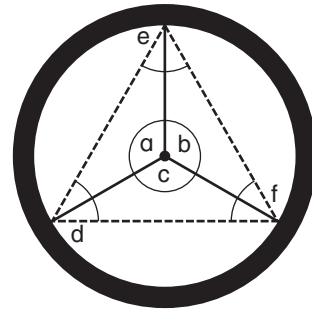
d

isosceles triangle with a base of 28 mm and two sides of 38 mm

Check the triangles are drawn accurately.

5

YOU WILL NEED:
• protractor



This bike wheel has 3 spokes.
The ends have been joined with a dotted line to make an equilateral triangle.

- a** Measure the angles at the centre of the wheel. **b** Measure the angles of the equilateral triangle.

Angle a =

Angle d =

Angle b =

Angle e =

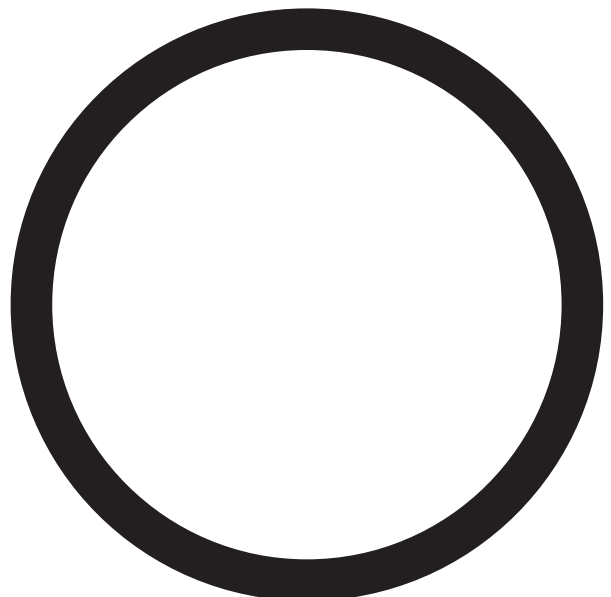
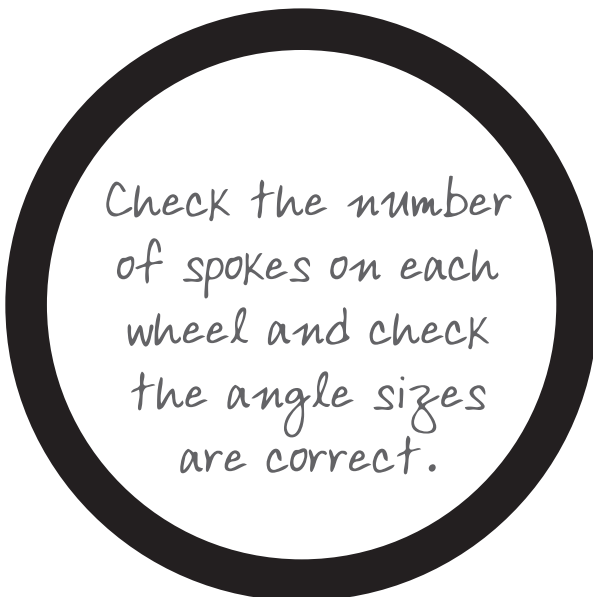
Angle c =

Angle f =

- c** Write about what you notice.

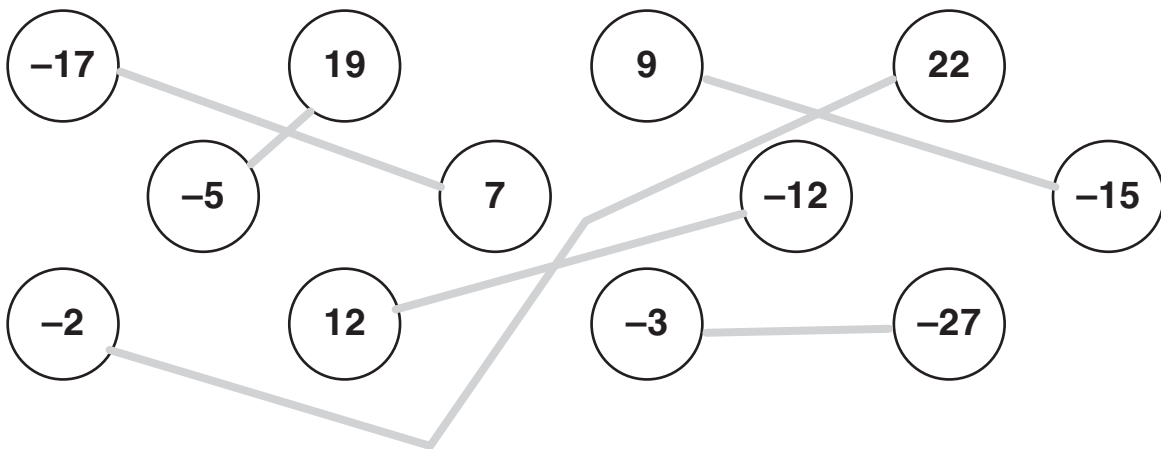
*All the central angles total 360° .
All the angles of the triangle total 180° .
The central angles are double the size of the angles of the triangle.*

- d** Draw different numbers of spokes on these wheels. Make sure the spokes are an equal distance apart. Join the ends of the spokes. Explore the angles at the centre of the wheels and at the ends.



10a Negative numbers and millions

1 Join pairs of numbers with a difference of **24**.



2 The table below shows the temperature of the planets in our solar system.

a What is the **difference** in temperature between these planets?

Neptune and Saturn → difference:

Earth and Jupiter → difference:

Uranus and Mercury → difference:

Venus and Mars → difference:

Mercury and Venus → difference:

Mars and Uranus → difference:

Planet	Average surface temperature (°C)
Neptune	-218
Jupiter	-145
Earth	7
Mars	-55
Venus	460
Mercury	167
Saturn	-139
Uranus	-197

b Although the **average** surface temperature of Earth is 7°C , different parts of the Earth are different temperatures. The deserts of Iran can reach temperatures as high as 70°C while Antarctica can get as low as -89°C . What is the difference in temperature between these hottest and coldest places on Earth?

159°C

c Mercury has the most extreme temperature reaching a very hot 427°C during the day and a very cold -173°C at night. What is the difference between the hottest and coldest temperatures on Mercury?

600°C



Answer these.

a $-4 - 3 =$

f $-6 -$ $= -8$

b $-5 - 8 =$

g $-9 -$ $= -12$

c $-2 + 6 =$

h $-3 +$ $= 0$

d $-7 + 4 =$

i $-4 +$ $= 5$

e $-1 + 1 =$

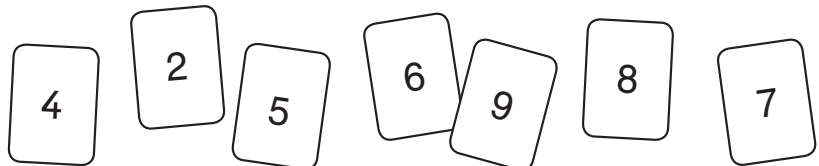
j $-8 +$ $= -2$



YOU WILL NEED:

- digit cards 2, 4, 5, 6, 7, 8, 9

Arrange these digit cards. They must follow the rule each time.



a an odd number greater than 7 million

b a multiple of 5 that is between 8 million and 9 million

c an even number between 5 million and 6 million

d a multiple of 5 that is less than 4 million

e a multiple of 2 that is between 3 million and 5 million

f the smallest possible even number

For a to e check the numbers entered make each sentence true.

5

a Here is a magic square.
Each column, row and diagonal adds to -12 .
Write in the missing number.

-6	$+4$	-10
-8	-4	0
$+2$	-12	-2

b Complete this magic square.
What do the columns, rows and diagonals add up to?

-8

-1	-6	-1
-2	-2	-4
-5	0	-3

c Complete this magic square.
What do the columns, rows and diagonals add up to?

0

-1	4	-3
-2	0	$+2$
$+3$	-4	$+1$

6 

a Enter $5 - - = 0$ and then $1 5 = = = = =$ on your calculator.

Write the numbers. Continue the pattern.

10 5 0 -5 -10 -15 -20 -25

b Enter $4 - - = 0$ and then $1 5 = = = = =$ on your calculator.

11 7 3 -1 -5 -9 -13 -17

c Enter $3 - - = 0$ and then $1 5 = = = = =$ on your calculator.

12 9 6 3 0 -3 -6 -9

d Explore different patterns in the same way and make up your own. Check the pattern works on the calculator you are using.

1

YOU WILL NEED:

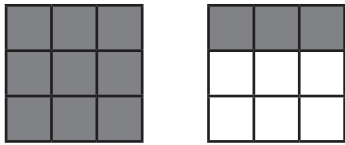
- coloured crayons

Colour the grids to show each fraction.
Write the improper fractions as mixed numbers. Simplify if possible.



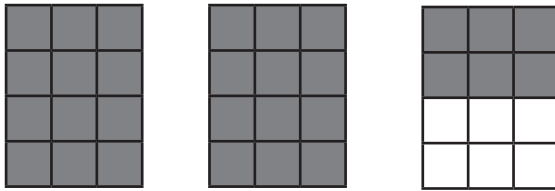
$$\frac{10}{8} = 2\frac{2}{8} = 2\frac{1}{4}$$

a



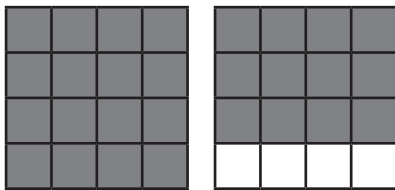
$$\frac{12}{9} = 1\frac{3}{9} = 1\frac{1}{3}$$

b



$$\frac{30}{12} = 2\frac{6}{12} = 2\frac{1}{2}$$

c



$$\frac{28}{16} = 1\frac{12}{16} = 1\frac{3}{4}$$

d



$$\frac{32}{10} = 3\frac{2}{10} = 3\frac{1}{5}$$



Write these mixed numbers as improper fractions. Change the whole number to a fraction as a first step.

$$7\frac{1}{10} = \frac{70}{10} + \frac{1}{10} = \frac{71}{10}$$

a $8\frac{1}{5} = \frac{40}{5} + \frac{1}{5} = \frac{41}{5}$

b $9\frac{3}{10} = \frac{90}{10} + \frac{3}{10} = \frac{93}{10}$

c $5\frac{1}{4} = \frac{20}{4} + \frac{1}{4} = \frac{21}{4}$

d $4\frac{1}{3} = \frac{12}{3} + \frac{1}{3} = \frac{13}{3}$

e $6\frac{3}{4} = \frac{24}{4} + \frac{3}{4} = \frac{27}{4}$

f $7\frac{2}{3} = \frac{21}{3} + \frac{2}{3} = \frac{23}{3}$

g $8\frac{9}{10} = \frac{80}{10} + \frac{9}{10} = \frac{89}{10}$

h $9\frac{4}{5} = \frac{45}{5} + \frac{4}{5} = \frac{49}{5}$



Put these sets of fractions in order of size, starting with the **smallest**. Write the common denominator in the centre to help you.

$\frac{1}{3}$

$\frac{3}{5}$

$\frac{2}{3}$

smallest

a

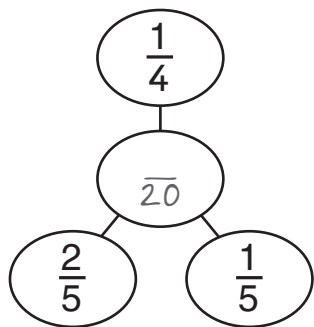
$\frac{1}{4}$

$\frac{1}{3}$

$\frac{3}{4}$

smallest

b



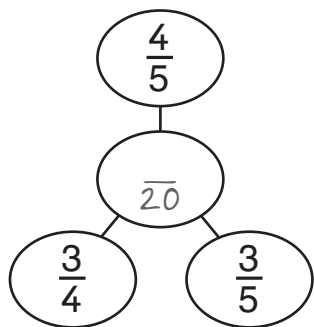
$$\frac{1}{5}$$

$$\frac{1}{4}$$

$$\frac{2}{5}$$

smallest

c



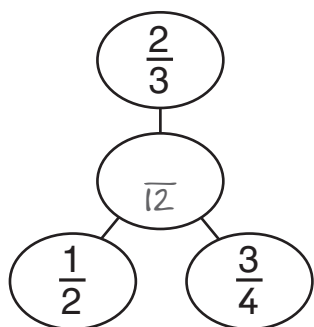
$$\frac{3}{5}$$

$$\frac{3}{4}$$

$$\frac{4}{5}$$

smallest

d



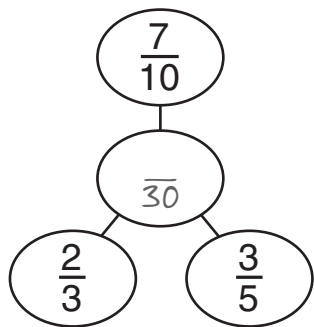
$$\frac{1}{2}$$

$$\frac{2}{3}$$

$$\frac{3}{4}$$

smallest

e



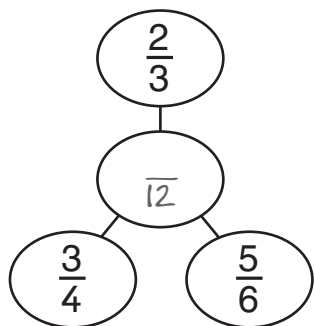
$$\frac{3}{5}$$

$$\frac{2}{3}$$

$$\frac{7}{10}$$

smallest

f



$$\frac{2}{3}$$

$$\frac{3}{4}$$

$$\frac{5}{6}$$

smallest



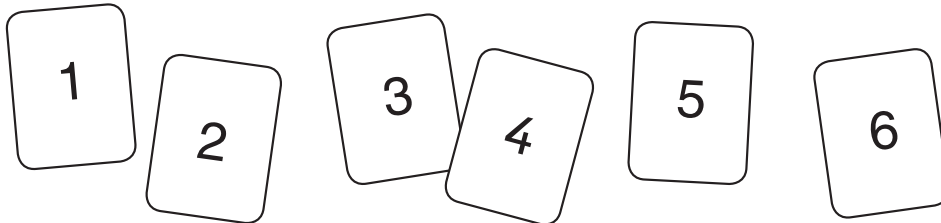
YOU WILL NEED:

- digit cards 1–6

Shuffle the cards. Turn them over one at a time.

Place each card in the boxes below to make improper or proper fractions.

Can you complete it so that the statement is true?

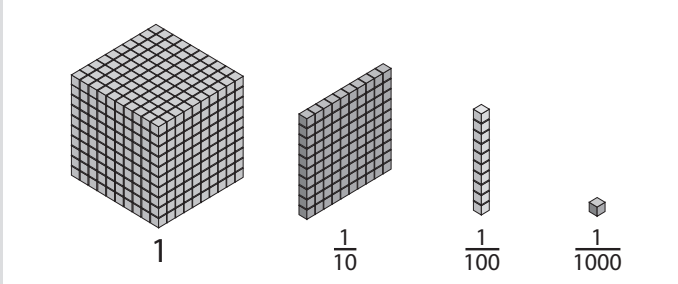


<hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/>						

Check the fraction statement is correct.

1

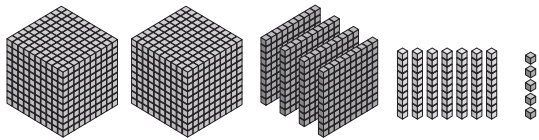
Write the value of these numbers as decimals. Use the example as your key.



1 $\frac{1}{10}$ $\frac{1}{100}$ $\frac{1}{1000}$

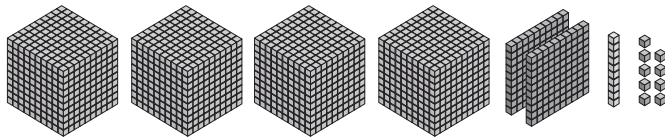
→ 1.111

a



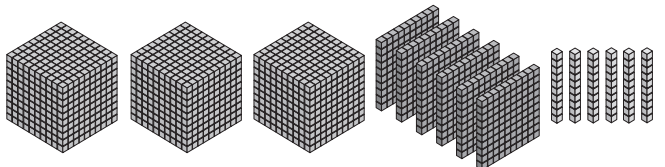
→ 2.475

b



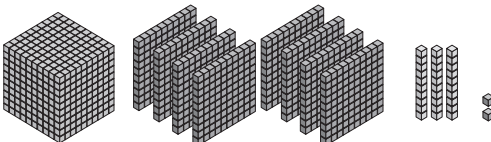
→ 4.219

c



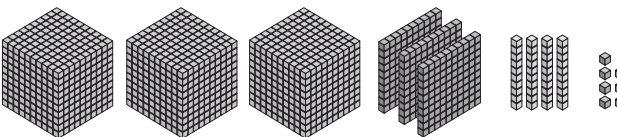
→ 3.661

d



→ 1.832

e



→ 3.347

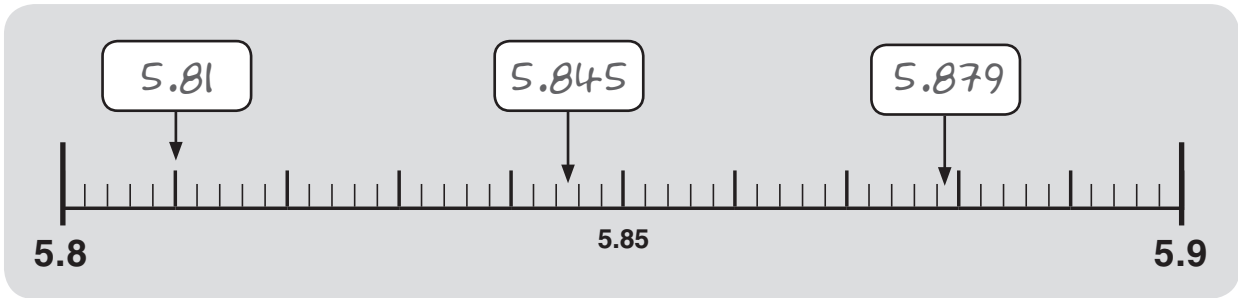
f



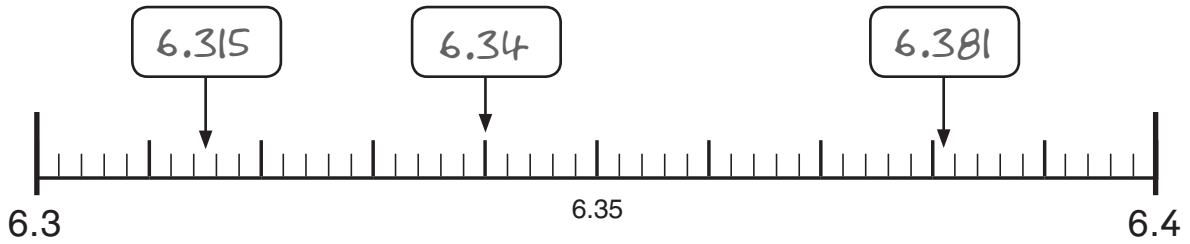
→ 2.156



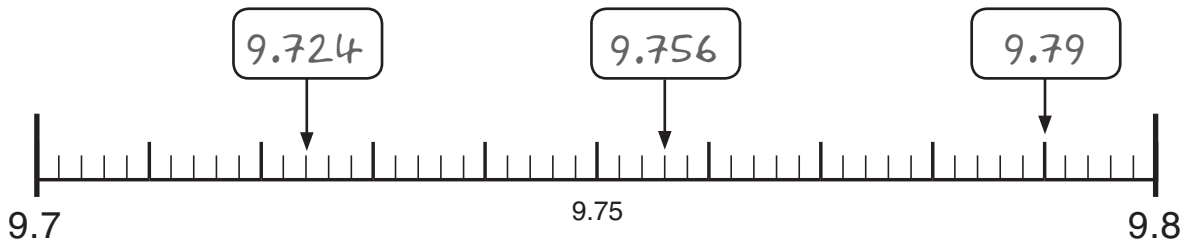
Write the decimal number each arrow points to.



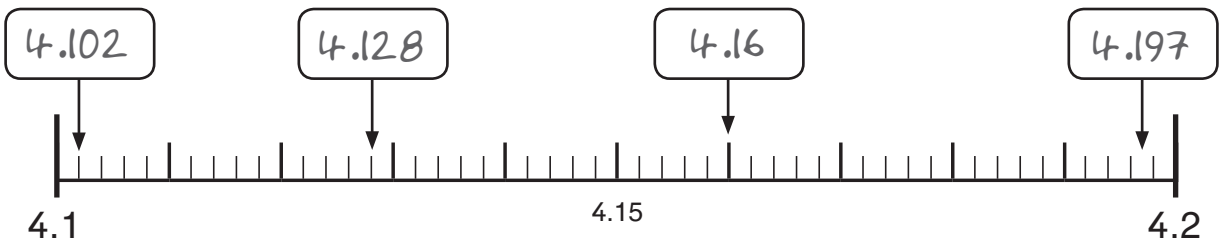
a



b



c



Write the value of the 2 digit in each of these numbers as a whole number or fraction.

a 158.327 $\frac{2}{100}$

e 955.792 $\frac{2}{1000}$

b 492.015 2

f 521.804 20

c 817.236 $\frac{2}{10}$

g 576.029 $\frac{2}{100}$

d 203.586 200

h 714.632 $\frac{2}{1000}$

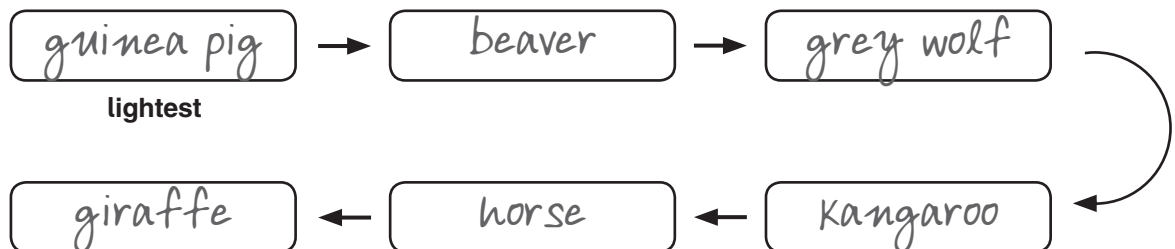


This table shows the mass of different animals.

Round each to complete the chart. Always round starting from the exact mass.

Type of animal	Mass (kg)	Rounded to the nearest $\frac{1}{100}$	Rounded to the nearest $\frac{1}{10}$	Rounded to the nearest whole number
beaver	1.352	1.35 Kg	1.4 Kg	1 Kg
kangaroo	35.668	35.67 Kg	35.7 Kg	36 Kg
horse	529.043	529.04 Kg	529 Kg	529 Kg
guinea pig	1.254	1.25 Kg	1.3 Kg	1 Kg
giraffe	530.917	530.92 Kg	530.9 Kg	531 Kg
grey wolf	35.625	35.63 Kg	35.6 Kg	36 Kg

Write the animals in order of mass, starting with the **lightest**.



YOU WILL NEED:

- digit cards 1–9
- paper and pencil

Shuffle the digit cards. Place them in a pile face down. Turn the cards over one at a time.

Draw the layout below on your paper. It must be large enough to hold your digit cards.

Place each card in one of the boxes before you look at the next card.

Can you complete the number statement so it is correct?

$$0. \boxed{} \boxed{} \boxed{} > 0. \boxed{} \boxed{} \boxed{} > 0. \boxed{} \boxed{} \boxed{}$$

Check the number statement.

Addition and subtraction using measurement

11a Applying addition and subtraction

1 Use mental methods to answer these.

a $3.5 + \boxed{5.75} = 9.25$

d $6.6 - \boxed{3.7} = 2.9$

b $\boxed{11.65} - 4.05 = 7.6$

e $\boxed{9.12} - 2.04 = 7.08$

c $\boxed{0.13} + 1.87 = 2$

f $1.95 + \boxed{3.24} = 5.19$

2 Answer these.

a
$$\begin{array}{r} 6.045 \\ + 19.68 \\ \hline \end{array}$$

$\boxed{25.725}$

d
$$\begin{array}{r} 23.779 \\ + 8.04 \\ \hline \end{array}$$

$\boxed{31.819}$

b
$$\begin{array}{r} 15.63 \\ + 40.657 \\ \hline \end{array}$$

$\boxed{56.287}$

e
$$\begin{array}{r} 7.98 \\ + 7.526 \\ \hline \end{array}$$

$\boxed{15.506}$

c
$$\begin{array}{r} 59.291 \\ + 3.153 \\ \hline \end{array}$$

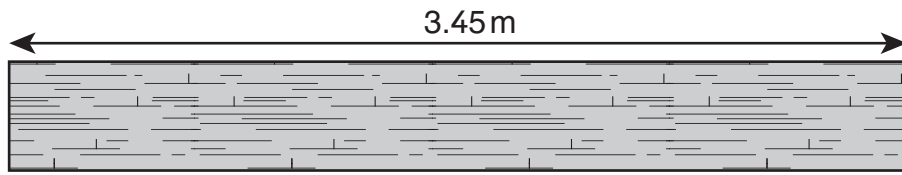
$\boxed{62.444}$

f
$$\begin{array}{r} 64.13 \\ + 9.86 \\ \hline \end{array}$$

$\boxed{73.99}$

3

Each plank of wood is 3.45 m in length. Each is cut into two pieces.
Calculate the missing lengths.



a

1.79 m

1.66 m

b

3.14 m

0.31 m

c

2.9 m

0.55 m

d

0.85 m

2.6 m

e

1.503 m

1.947 m

f

2.678 m

0.772 m

g

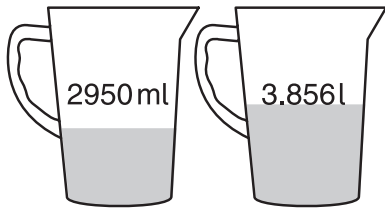
1.062 m

2.388 m



Calculate the **difference** between each of these measures.

a



906ml

d



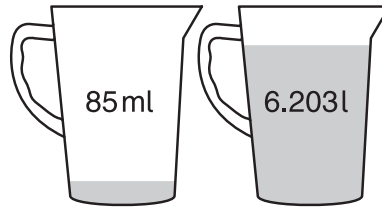
6017ml

b



742ml

e



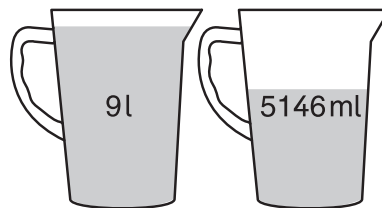
6118ml

c



875ml

f



3854ml



Answer these problems.

Draw a bar model for each to help you.

a

The total of 3 numbers is 27.85. Two of the numbers are 4.6 and 12.92. What is the third number?

10.33

b

The difference between 2 numbers is 6.85. The larger number is 19.38. What is the smaller number?

12.53

c

A cake shop makes biscuits using 7.86kg of butter and double this amount of flour. What is the total mass of the mixture when the flour and butter are added together?

23.58kg

d

Roadworks closes a road and traffic is diverted an extra 9.49km. This makes a bus journey 32.3km. What is the normal length of this bus journey?

22.81km

e

The total of 3 numbers is 54.62. One of the numbers is 14.68 and another is double this number. What is the third number?

10.58

f

The difference between 2 numbers is 7.39. The smaller number is 25.72. What is the larger number?

33.11



2 decimal points are missing in each of these calculations. Write them in the correct place.

a $34.56 + 90.3 = 124.86$

b $57.38 + 102.7 = 160.08$

c $5.639 + 2.601 = 8.24$

d $420.9 + 318.4 = 739.3$

e $285.7 - 170.6 = 115.1$

f $95.24 - 58.2 = 37.04$

g $7.248 - 3.95 = 3.298$

h $63.74 - 5.46 = 58.28$



Complete these equivalent fraction chains.

$$\text{a } \frac{2}{\boxed{3}} = \frac{\boxed{4}}{6} = \frac{6}{\boxed{9}} = \frac{8}{\boxed{12}} = \frac{10}{15}$$

$$\text{b } \frac{\boxed{2}}{5} = \frac{4}{\boxed{10}} = \frac{\boxed{6}}{15} = \frac{\boxed{8}}{20} = \frac{10}{25}$$

$$\text{c } \frac{\boxed{3}}{4} = \frac{\boxed{6}}{8} = \frac{9}{\boxed{12}} = \frac{\boxed{12}}{16} = \frac{16}{20}$$

$$\text{d } \frac{1}{\boxed{6}} = \frac{2}{\boxed{12}} = \frac{\boxed{3}}{18} = \frac{4}{\boxed{24}} = \frac{5}{30}$$

$$\text{e } \frac{9}{\boxed{10}} = \frac{\boxed{18}}{20} = \frac{27}{\boxed{30}} = \frac{\boxed{36}}{40} = \frac{45}{50}$$

$$\text{f } \frac{\boxed{3}}{5} = \frac{\boxed{6}}{10} = \frac{9}{\boxed{15}} = \frac{12}{\boxed{20}} = \frac{15}{25}$$



Add these fractions. Simplify your answer where possible.

a $\frac{1}{4} + \frac{1}{8} = \boxed{\frac{3}{8}}$

f $\frac{7}{10} + \frac{1}{2} = \boxed{\frac{12}{10}} \quad 1\frac{2}{10} \quad 1\frac{1}{5}$

b $\frac{2}{3} + \frac{1}{6} = \boxed{\frac{5}{6}}$

g $\frac{3}{4} + \frac{5}{8} = \boxed{\frac{11}{8}} \quad 1\frac{3}{8}$

c $\frac{3}{8} + \frac{1}{2} = \boxed{\frac{7}{8}}$

h $2\frac{1}{2} + 1\frac{1}{4} = \boxed{3\frac{3}{4}}$

d $\frac{2}{5} + \frac{3}{10} = \boxed{\frac{7}{10}}$

i $3\frac{1}{5} + 4\frac{3}{10} = \boxed{7\frac{5}{10}} \quad 7\frac{1}{2}$

e $\frac{5}{6} + \frac{2}{3} = \boxed{\frac{9}{6}} \quad 1\frac{3}{6} \quad 1\frac{1}{2}$

j $1\frac{1}{6} + 2\frac{1}{2} = \boxed{3\frac{4}{6}} \quad 3\frac{2}{3}$



Answer these. Simplify your answer where possible.

a $\frac{7}{8} - \frac{1}{4} = \boxed{\frac{5}{8}}$

d $4\frac{2}{3} - 1\frac{1}{6} = \boxed{3\frac{3}{6}} \quad 3\frac{1}{2}$

b $\frac{5}{6} - \frac{1}{3} = \boxed{\frac{3}{6}} \quad \frac{1}{2}$

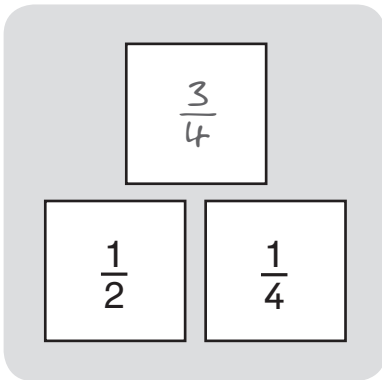
e $2\frac{3}{4} - \frac{1}{8} = \boxed{2\frac{5}{8}}$

c $\frac{9}{10} - \frac{1}{2} = \boxed{\frac{4}{10}} \quad \frac{2}{5}$

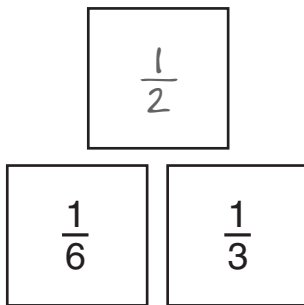
f $6\frac{4}{5} - 3\frac{3}{10} = \boxed{3\frac{5}{10}} \quad 3\frac{1}{2}$



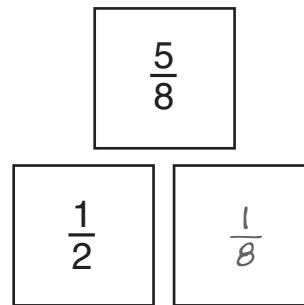
Write the missing fractions in these addition walls. Simplify your answer where possible.



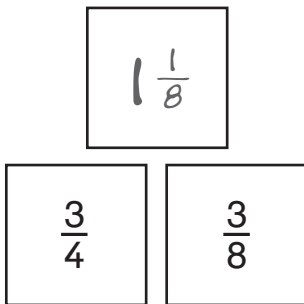
a



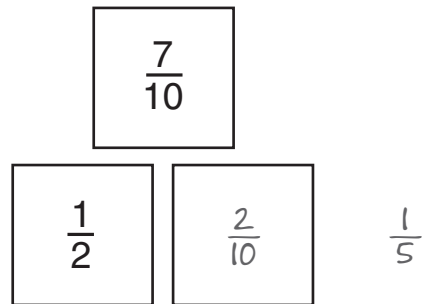
d



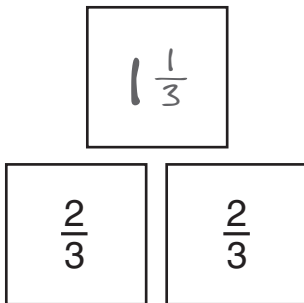
b



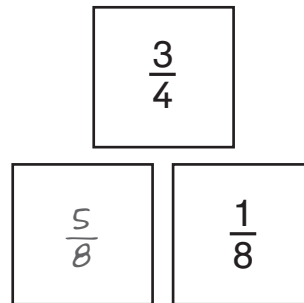
e



c



f

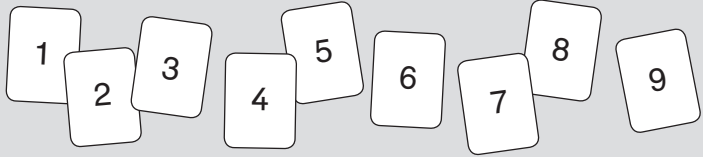


5

YOU WILL NEED:
• digit cards 1–9

Arrange the digit cards. Make different improper or proper fractions to make these totals.

$\frac{\square}{\square} + \frac{\square}{\square} = 5$



Possible answers:

$\frac{6}{2} + \frac{8}{4}$ $\frac{6}{4} + \frac{7}{2}$ $\frac{3}{6} + \frac{9}{2}$ $\frac{9}{3} + \frac{4}{2}$ $\frac{7}{2} + \frac{9}{6}$ $\frac{9}{2} + \frac{4}{8}$

a Find five different solutions.

$\frac{6}{4} + \frac{3}{2} = 3$ $\frac{5}{3} + \frac{8}{6} = 3$ $\frac{5}{2} + \frac{3}{6} = 3$
 $\frac{9}{6} + \frac{3}{2} = 3$ $\frac{5}{2} + \frac{4}{8} = 3$

b Find five different solutions.

$\frac{8}{2} + \frac{9}{6} = 5\frac{1}{2}$ $\frac{9}{3} + \frac{5}{2} = 5\frac{1}{2}$ $\frac{5}{2} + \frac{9}{3} = 5\frac{1}{2}$
 $\frac{8}{2} + \frac{6}{4} = 5\frac{1}{2}$ $\frac{6}{2} + \frac{9}{4} = 5\frac{1}{2}$

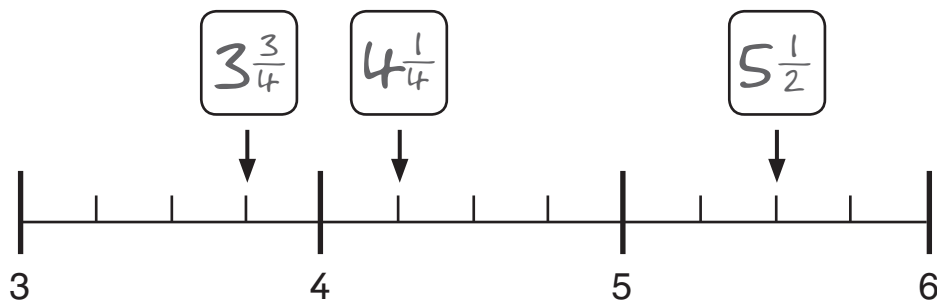
Make up your own fraction total problems for a friend to try.



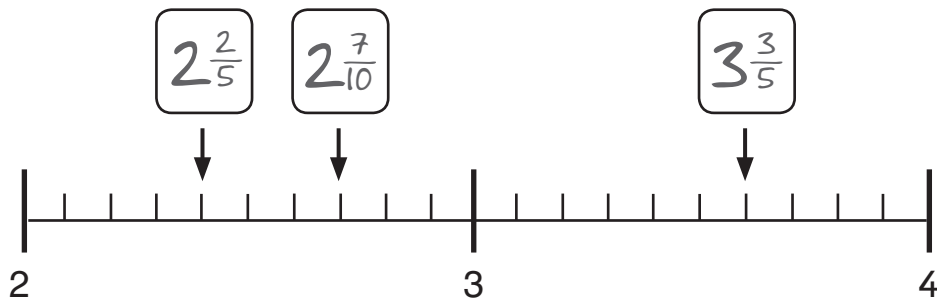
12a Exploring fractions

- 1 Write the fractions shown on these number lines.

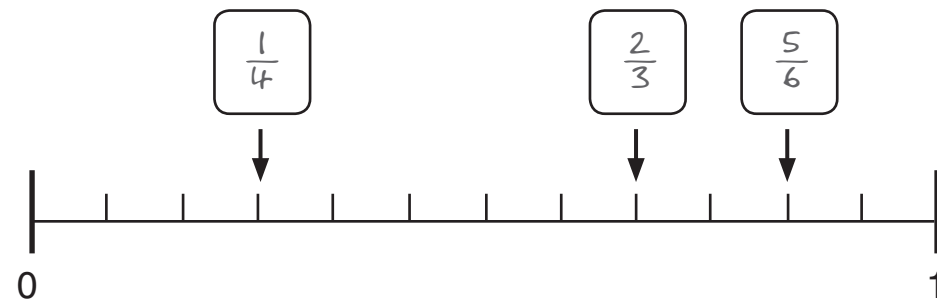
a



b

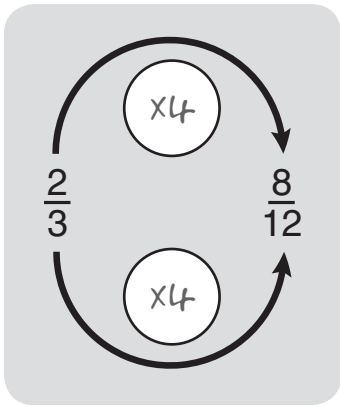


c

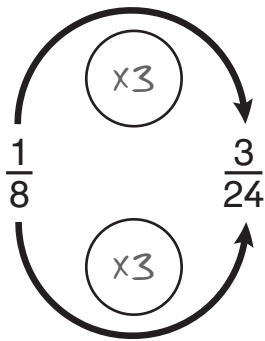


2

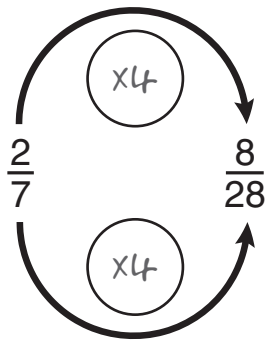
Show what you multiply or divide by to make these equivalent fractions.



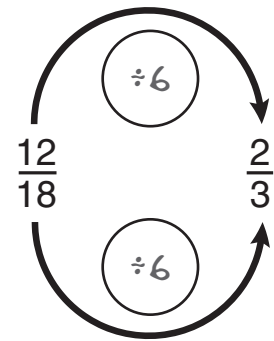
a



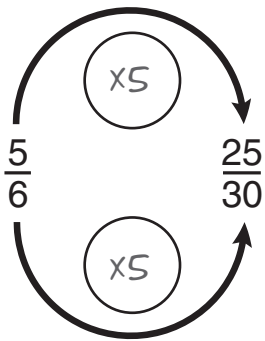
c



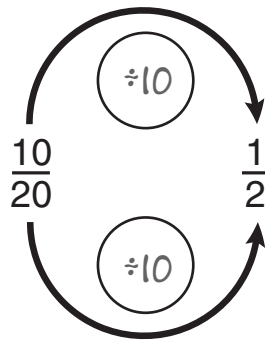
e



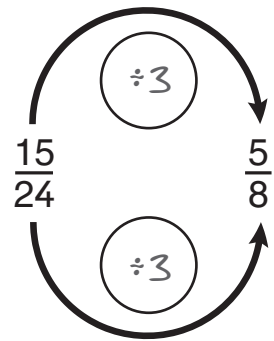
b



d



f



3

Complete these equivalent fractions.

a $\frac{4}{5} = \frac{\boxed{12}}{15}$

f $\frac{3}{5} = \frac{9}{\boxed{15}}$

g $\frac{\boxed{2}}{5} = \frac{8}{20}$

b $\frac{2}{\boxed{6}} = \frac{8}{24}$

h $\frac{3}{4} = \frac{\boxed{15}}{20}$

h $\frac{7}{10} = \frac{\boxed{35}}{50}$

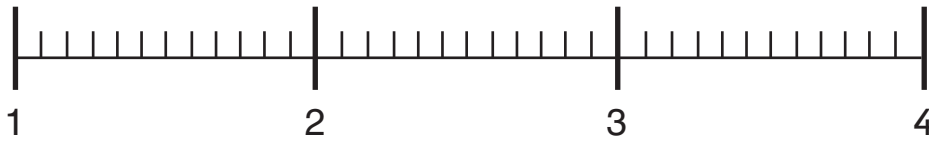
c $\frac{\boxed{6}}{10} = \frac{12}{20}$

i $\frac{7}{\boxed{8}} = \frac{14}{16}$

i $\frac{5}{8} = \frac{30}{\boxed{48}}$



Write $<$, $>$ or $=$ to make these true. Use the number line to help you.



a $3\frac{1}{4}$ $3\frac{2}{3}$

d $1\frac{7}{12}$ $2\frac{1}{4}$

b $1\frac{5}{12}$ $1\frac{1}{2}$

e $2\frac{3}{4}$ $2\frac{2}{3}$

c $3\frac{2}{6}$ $3\frac{1}{3}$

f $1\frac{1}{3}$ $1\frac{5}{6}$



Order these fractions from **largest** to **smallest**.

a

$\frac{2}{3}$	$\frac{1}{12}$	$\frac{3}{4}$	$\frac{1}{2}$
$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{12}$

largest

d

$\frac{7}{8}$	$\frac{7}{10}$	$\frac{3}{5}$	$\frac{5}{6}$
$\frac{7}{8}$	$\frac{5}{6}$	$\frac{7}{10}$	$\frac{3}{5}$

largest

b

$\frac{1}{4}$	$\frac{3}{8}$	$\frac{3}{10}$	$\frac{1}{3}$
$\frac{3}{8}$	$\frac{1}{3}$	$\frac{3}{10}$	$\frac{1}{4}$

largest

e

$\frac{4}{5}$	$\frac{9}{12}$	$\frac{5}{8}$	$\frac{2}{3}$
$\frac{4}{5}$	$\frac{9}{12}$	$\frac{2}{3}$	$\frac{5}{8}$

largest

c

$\frac{5}{6}$	$\frac{3}{4}$	$\frac{5}{12}$	$\frac{3}{8}$
$\frac{5}{6}$	$\frac{3}{4}$	$\frac{5}{12}$	$\frac{3}{8}$

largest

f

$\frac{5}{12}$	$\frac{3}{5}$	$\frac{3}{10}$	$\frac{5}{8}$
$\frac{5}{8}$	$\frac{3}{5}$	$\frac{5}{12}$	$\frac{3}{10}$

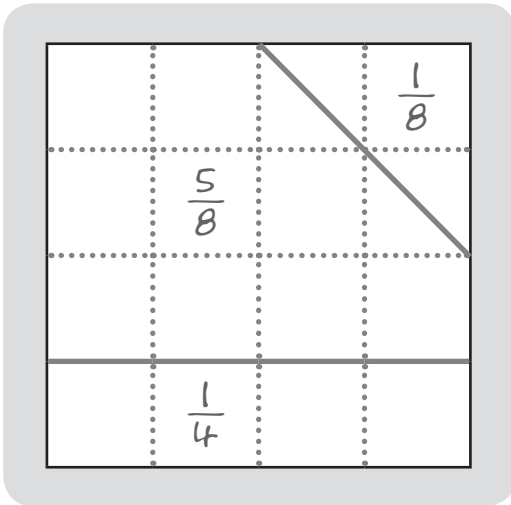
largest

6

YOU WILL NEED:

- ruler

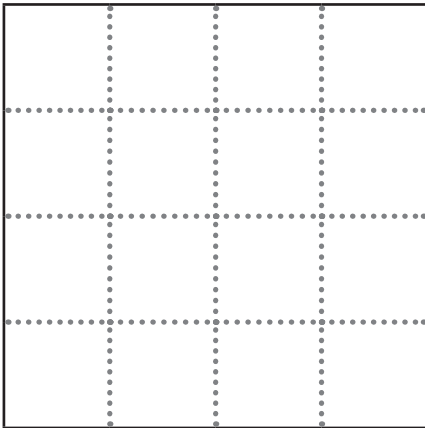
This grid has been divided into 3 unequal parts.



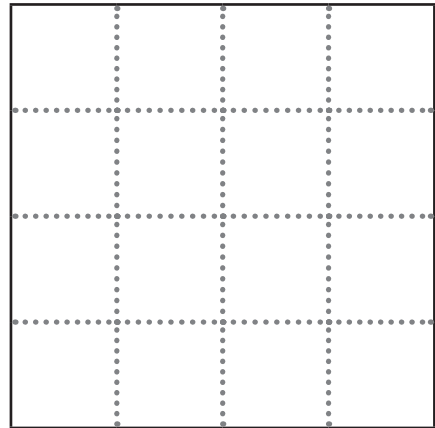
Divide each of these grids into **3 unequal parts** with **straight** lines.

Divide them each differently. Write the fraction of each part.

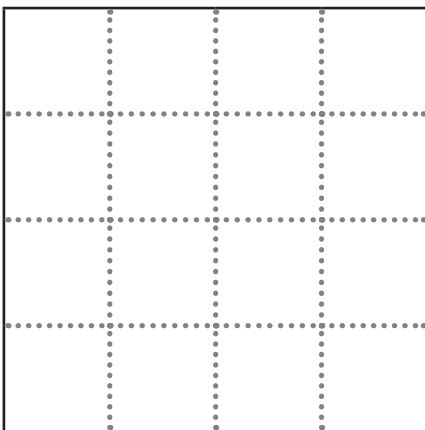
a



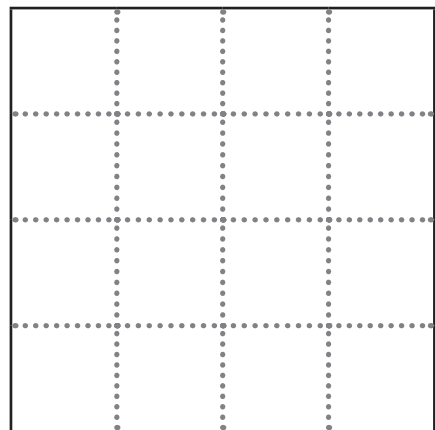
c



b



d



Check each grid and fraction.



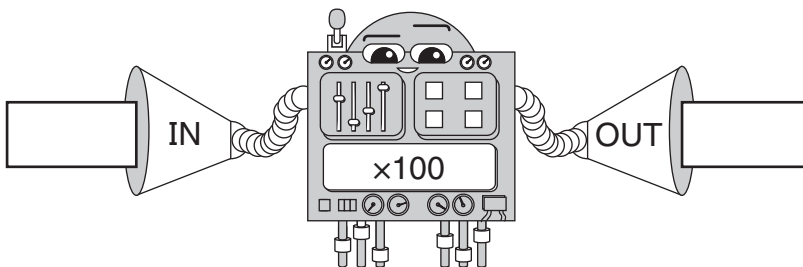
Complete this chart.

Start number	$\times 10$	$\times 100$	$\times 1000$
9.34	93.4	934	9340
70.03	700.3	7003	70030
2.74	27.4	274	2740
38.05	380.5	3805	38050
149.905	1499.05	14990.5	149905
392.515	3925.15	39251.5	392515



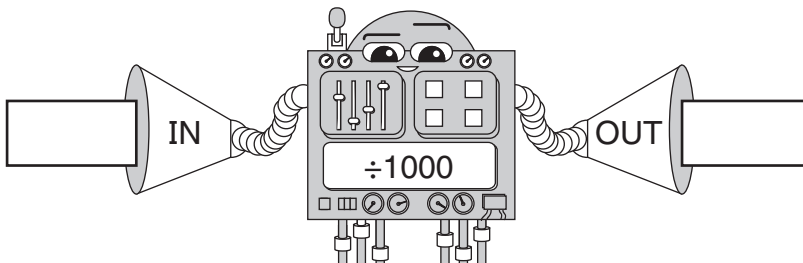
Write the numbers coming out of these function machines.

a



IN	5.18	0.9	24.73	6.472	330.55	10.899	0.217
OUT	518	90	2473	647.2	33055	1098.9	21.7

b



IN	4956	830219	711	35239.5	1608.4	27201.3	463.9
OUT	4.956	830.219	0.711	35.2395	1.6084	27.2013	0.4639



Write these grams as kilograms.

a $3402 \text{ g} = 3.402 \text{ kg}$

e $6210 \text{ g} = 6.21 \text{ kg}$

b $575 \text{ g} = 0.575 \text{ kg}$

f $9 \text{ g} = 0.009 \text{ kg}$

c $11\,839 \text{ g} = 11.839 \text{ kg}$

g $25\,700 \text{ g} = 25.7 \text{ kg}$

d $84 \text{ g} = 0.084 \text{ kg}$

h $3005 \text{ g} = 3.005 \text{ kg}$



Write these litres as millilitres.

a $2.015 \text{ l} = 2015 \text{ ml}$

e $7 \text{ l} = 7000 \text{ ml}$

b $14.755 \text{ l} = 14\,755 \text{ ml}$

f $23.019 \text{ l} = 23\,019 \text{ ml}$

c $3.5 \text{ l} = 3500 \text{ ml}$

g $9.45 \text{ l} = 9450 \text{ ml}$

d $8.962 \text{ l} = 8962 \text{ ml}$

h $6.008 \text{ l} = 6008 \text{ ml}$



Convert these measurements to decimals.

a $56\frac{7}{10} \text{ m} = 56.7 \text{ m}$

b $4\frac{3}{8} \text{ km} = 4.375 \text{ km}$

c $311\frac{1}{4} \text{ cm} = 311.25 \text{ cm}$

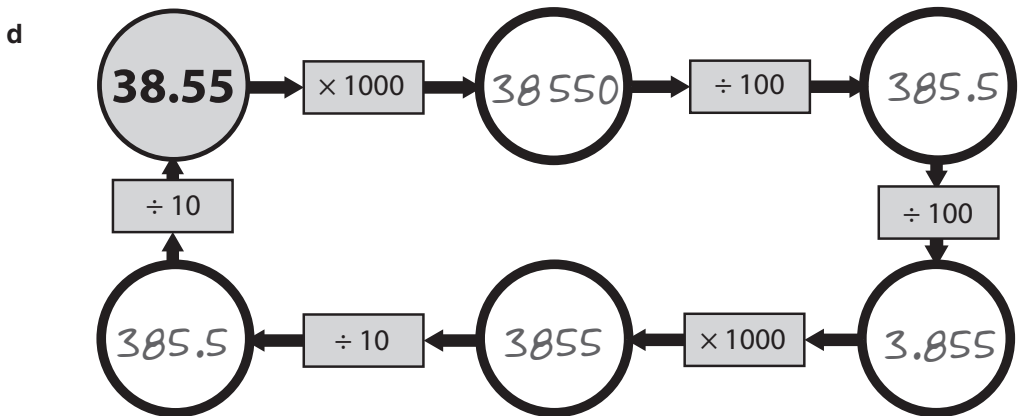
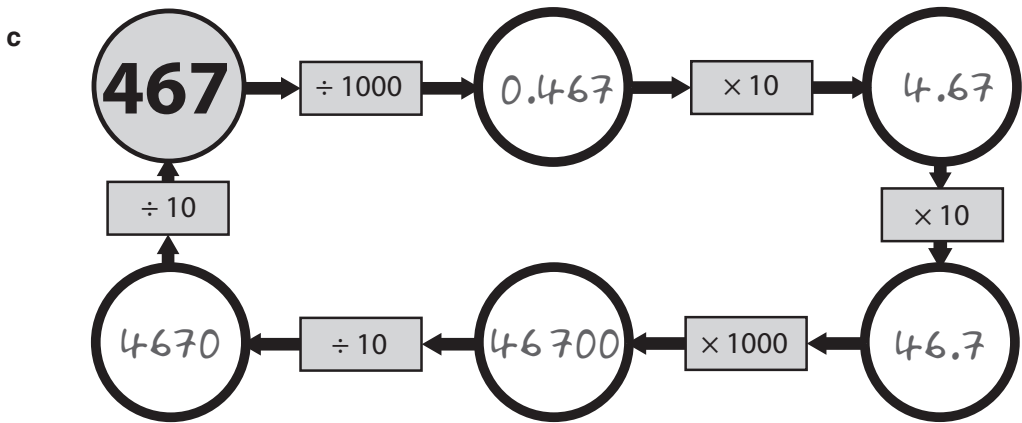
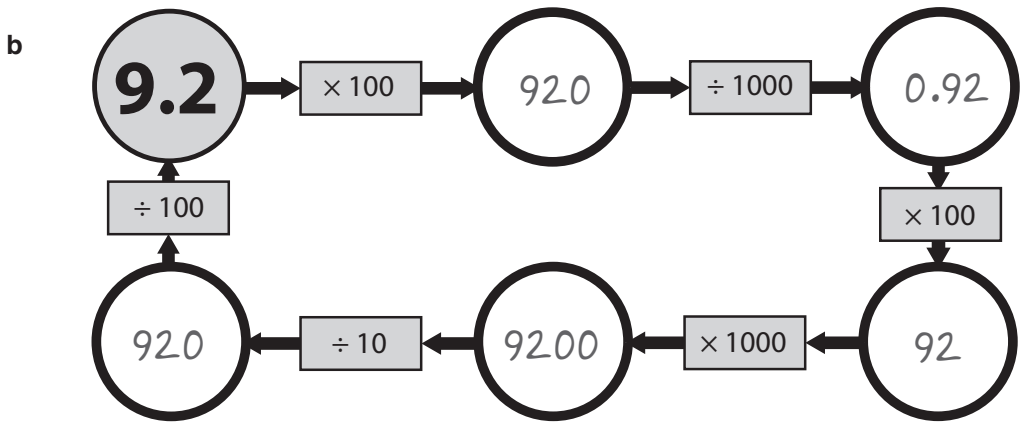
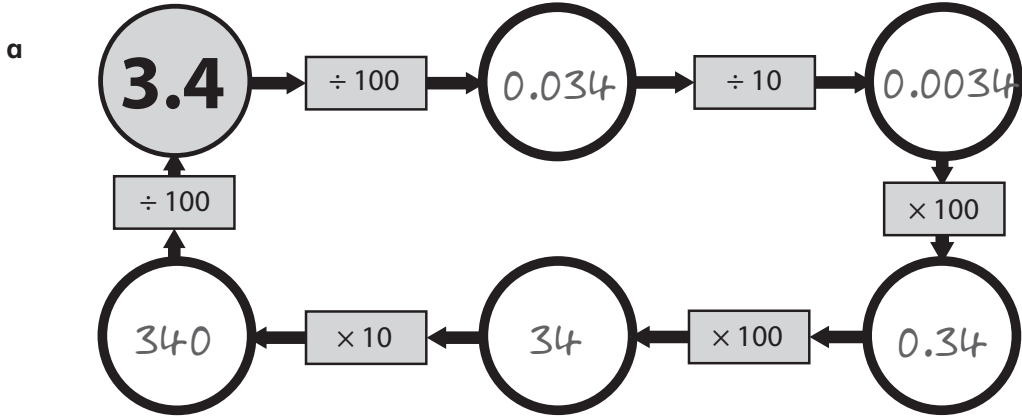
d $79928\frac{1}{2} \text{ km} = 79928.5 \text{ km}$

e $6\frac{4}{5} \text{ cm} = 6.8 \text{ cm}$

f $17\frac{5}{8} \text{ m} = 17.625 \text{ m}$

6

Complete these diagrams.





100%																			
50%										50%									
25%					25%					25%					25%				
10%		10%		10%		10%		10%		10%		10%		10%		10%		10%	
5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%

Complete this table. Use the percentage chart to help you.

100% of the length	50% of the length	25% of the length	10% of the length	5% of the length
60 m	30 m	15 m	6 m	3 m
340 m	170 m	85 m	34 m	17 m
12 m	6 m	3 m	1.2 m	0.6 m
224 m	112 m	56 m	22.4 m	11.2 m
190 m	95 m	47.5 m	19 m	9.5 m
35 m	17.5 m	8.75 m	3.5 m	1.75 m



Change these test scores to percentages.

a $\frac{15}{20} =$

d $\frac{45}{50} =$

g $\frac{19}{20} =$

b $\frac{3}{10} =$

e $\frac{3}{5} =$

h $\frac{22}{25} =$

c $\frac{20}{25} =$

f $\frac{8}{10} =$

i $\frac{38}{50} =$



Change these percentages to decimal and fractions. Make each fraction as simple as possible.

$$80\% = 0.8 = \frac{8}{10} = \frac{4}{5}$$

a $50\% = 0.5 = \frac{5}{10} = \frac{1}{2}$

b $60\% = 0.6 = \frac{6}{10} = \frac{3}{5}$

c $20\% = 0.2 = \frac{2}{10} = \frac{1}{5}$

d $25\% = 0.25 = \frac{25}{100} = \frac{1}{4}$

e $75\% = 0.75 = \frac{75}{100} = \frac{3}{4}$

f $5\% = 0.05 = \frac{5}{100} = \frac{1}{20}$

g $65\% = 0.65 = \frac{65}{100} = \frac{13}{20}$

h $36\% = 0.36 = \frac{36}{100} = \frac{9}{25}$

i $19\% = 0.19 = \frac{19}{100} = \frac{19}{100}$

j $74\% = 0.74 = \frac{74}{100} = \frac{37}{50}$



Calculate these.

a $10\% \text{ of } \pounds 95 = \pounds 9.50$

b $5\% \text{ of } \pounds 70 = \pounds 3.50$

c $20\% \text{ of } \pounds 420 = \pounds 84$

d $70\% \text{ of } \pounds 800 = \pounds 560$

e $1\% \text{ of } \pounds 238 = \pounds 2.38$

f $45\% \text{ of } \pounds 60 = \pounds 27$

g $32\% \text{ of } \pounds 140 = \pounds 44.80$

h $61\% \text{ of } \pounds 163 = \pounds 99.43$

i $17\% \text{ of } \pounds 587 = \pounds 99.79$

5

Ravinder is saving up to buy an electric guitar that costs £97.99. He has collected 400 coins. Find out if he has saved enough for his guitar.

400 coins:
 22% are 1p coins
 19% are 2p coins
 12% are 5p coins
 20% are 10p coins
 2% are 20p coins
 8% are 50p coins
 17% are £1 coins

Complete this table to work out how much Ravinder has saved.

	1p coins	2p coins	5p coins	10p coins	20p coins	50p coins	£1 coins
Number of coins	88	76	48	80	8	32	68
Total value	88p	£1.52	£2.40	£8.00	£1.60	£16.00	£68.00

Total amount in the jar: £ 98.40 YES

Has Ravinder saved enough for his guitar?



Factors, scaling and long multiplication and division

13a All about factors

1

Write 6 multiples of each of these numbers. Each multiple should be between 75 and 130.

5 → 80, 85, 90, 95, 100, 105, 100, 115, 120, 125

6 → 78, 84, 90, 96, 102, 108, 114, 120

8 → 80, 88, 96, 104, 112, 120, 128

9 → 81, 90, 99, 108, 117, 126

2

List the first 10 multiples of 6. List the first 10 multiples of 8.

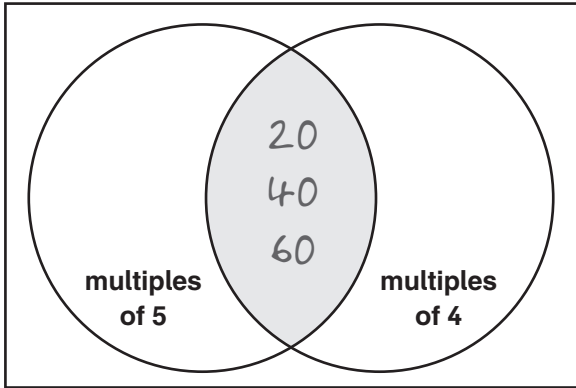
Now circle the common multiples of 6 and 8.

multiples of 6	6	12	18	24	30	36	42	48	54	60
multiples of 8	8	16	24	32	40	48	56	64	72	80

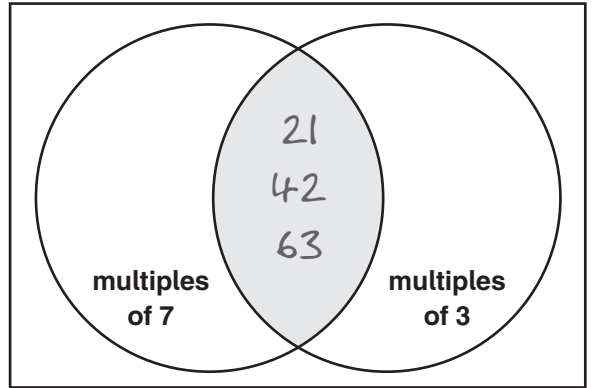


Write three numbers in the shaded part of each Venn diagram.

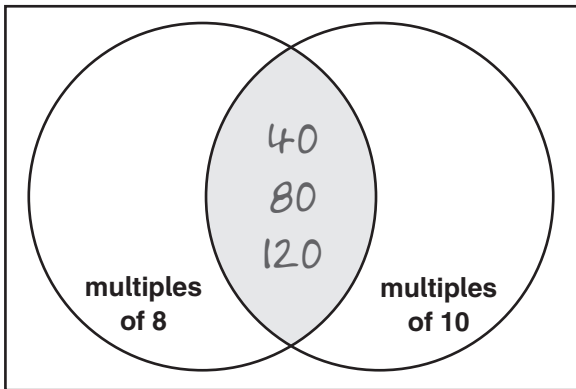
a



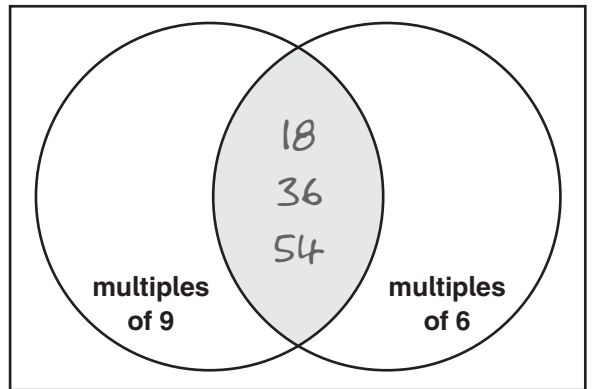
c



b

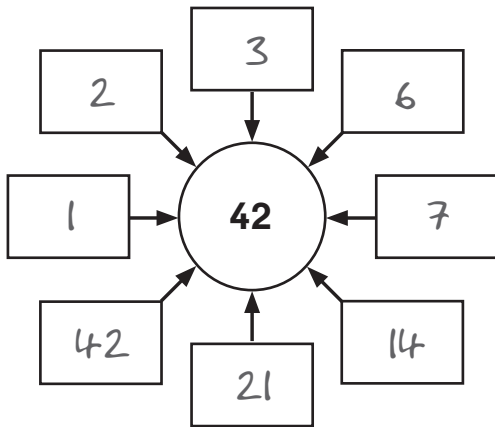


d

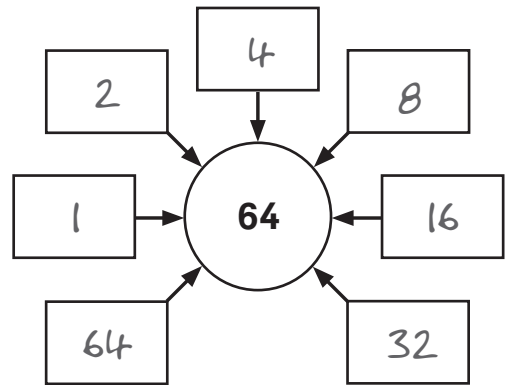


Complete these arrow diagrams. The numbers in the boxes are **factors** of the number in the centre.

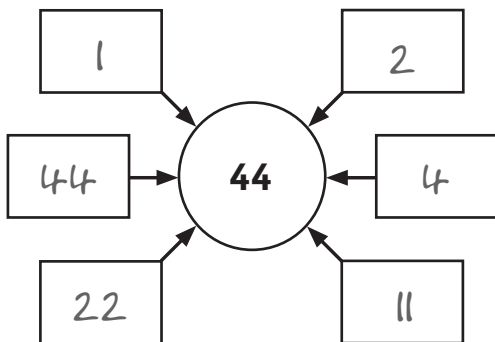
a



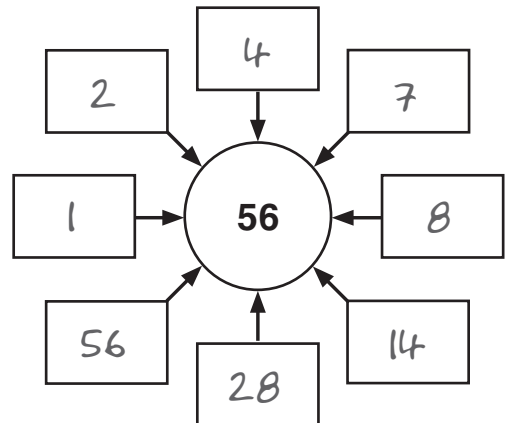
c



b



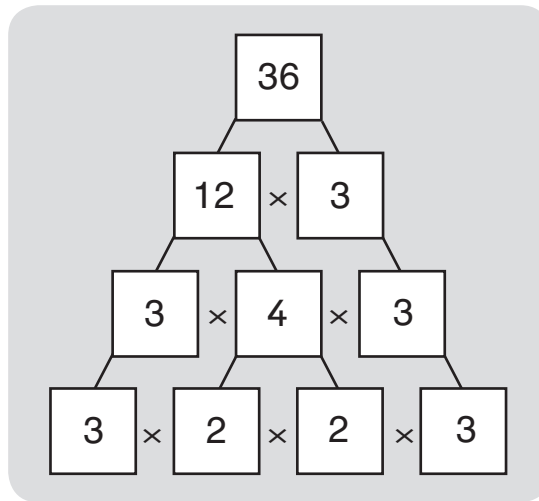
d



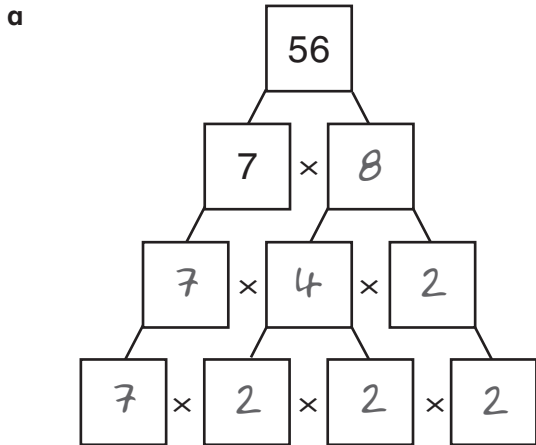
5

This factor tree shows a way of finding prime factors.

Start with any pair of factors of 36.
Then find their factors.
Continue until you get prime factors.
 $3 \times 2 \times 2 \times 3 = 36$
2 and 3 are prime factors of 36.

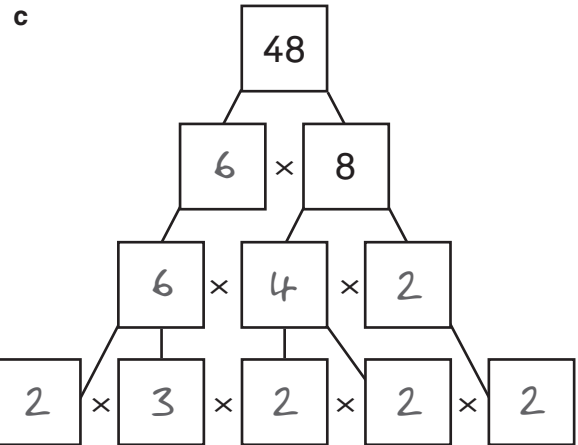


Complete these factor trees.
Then write prime factors for each number.



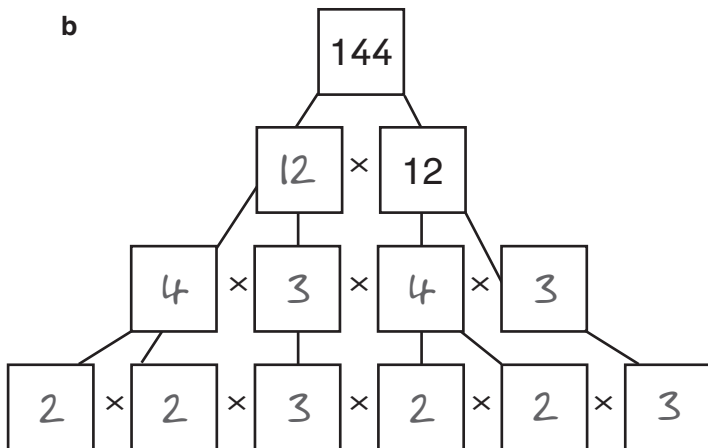
7 and 2

are the prime factors of 56



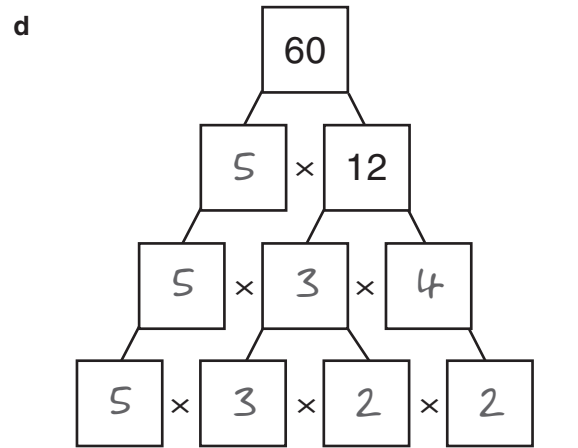
2 and 3

are the prime factors of 48



2 and 3

are the prime factors of 144



5 and 2 and 3

are the prime factors of 60

6

Alice goes to a judo club each Thursday. Her grandparents watch her every 3 weeks. She has a competition every 4 weeks. How often do her grandparents watch her in a competition?

Explain how you worked this out:

Her grandparents see her in a competition every 12 weeks.

7

'Multiples of 9 have digits that add together to make a multiple of 9.'

Is that **ALWAYS**, SOMETIMES or NEVER true? Circle your answer.

How can you prove this?

1 Complete these multiplication squares.

a

4	×	6	→	24
x		x		

2	×	3	→	6
↓		↓		
8		18		

b

3	×	8	→	24
x		x		

7	×	8	→	56
↓		↓		
21		64		

c

5	×	6	→	30
x		x		

9	×	4	→	36
↓		↓		
45		24		

2 Answer these. Write down the mental methods you used.

$37 \times 12 =$ 444

Working:

$37 \times 10 = 370$

$37 \times 2 = 74$

$370 + 74 = 444$

a $237 \times 4 =$ 948

Working:

d $144 \times 12 =$ 1728

Working:

b $58 \times 15 =$ 870

Working:

e $4250 \times 15 =$ 63750

Working:

c $438 \times 20 =$ 8760

Working:

f $3145 \times 20 =$ 62900

Working:



Answer these. Write down the mental methods you used.

$110 \div 5 =$

22

Working:

$110 \div 10 = 11$

$11 \times 2 = 22$

a $256 \div 4 =$

64

Working:

d $1010 \div 5 =$

202

Working:

b $740 \div 5 =$

148

Working:

e $4280 \div 20 =$

214

Working:

c $920 \div 20 =$

46

Working:

f $2540 \div 4 =$

635

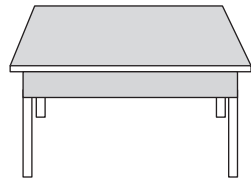
Working:



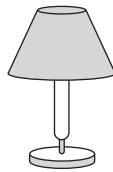
Work out the cost of these.



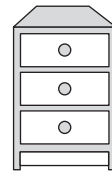
£40



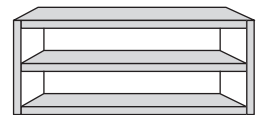
£70



£12



£30



£15

a 30 chairs =

£1200

d 30 shelves =

£450

b 50 desks =

£3500

e 60 lamps =

£720

c 40 drawers =

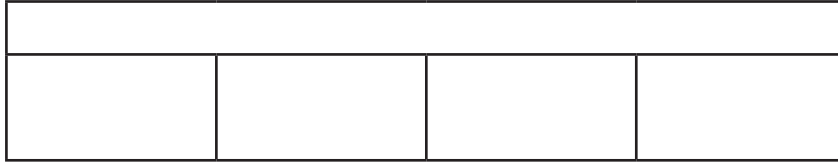
£1200

f 50 chairs =

£2000



Answer these problems.
Draw a bar model for each to help you.



a A bus has 52 passengers on it. A quarter of them get off at the market. How many passengers are left on the bus?

39

b Noah was sponsored by lots of people for a Swimathon. He will get £38 for every length of the pool he swims. He managed to swim 20 lengths. How much money did he raise in total?

£760

c Magda has read 137 pages in her book this week, but Ibrahim has read three times more pages than Magda. How many pages has Ibrahim read in total?

411

d A recipe uses 896 g of flour to make 32 cookies. Mrs Cook only wants to make 8 cookies. How much flour will she need to make 8 cookies?

224g

e Halima's journey to school is 1.35 km. Evan's journey is 6 times further than Halima's. How far does Evan travel to school each day?

8.1km



Multiply together the numbers at the corners of each square to find the number that goes in the centre. Choose your own method to answer them.

4	3
360	
6	5

Working:
 $4 \times 3 = 12$
 $12 \times 6 = 72$
 $72 \times 5 = 360$

a

7	4
672	
8	3

Working:

d

6	7
1764	
7	6

Working:

b

5	8
1080	
9	3

Working:

e

8	8
4096	
8	8

Working:

c

5	5
2025	
9	9

Working:

f

9	7
3024	
6	8

Working:



Answer these. Use the grid method.

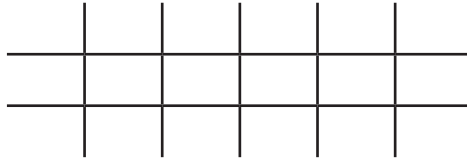
a $384 \times 6 =$ 2304



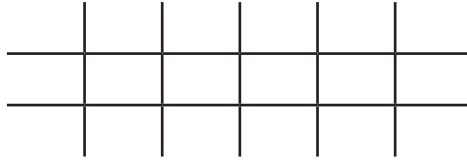
b $475 \times 8 =$ 3800



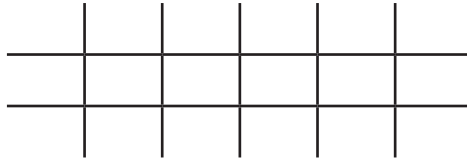
c $697 \times 9 =$



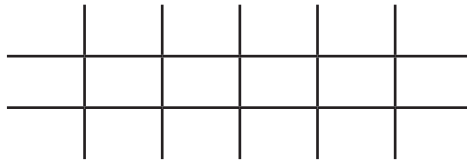
d $1045 \times 4 =$



e $3184 \times 7 =$



f $4108 \times 6 =$



3 Estimate answers first. Then work out the calculations.
Check your answers against your estimates.

a $\begin{array}{r} 1387 \\ \times \quad 6 \\ \hline \end{array}$

d $\begin{array}{r} 3084 \\ \times \quad 7 \\ \hline \end{array}$

b $\begin{array}{r} 2405 \\ \times \quad 4 \\ \hline \end{array}$

e $\begin{array}{r} 5742 \\ \times \quad 9 \\ \hline \end{array}$

c $\begin{array}{r} 3928 \\ \times \quad 8 \\ \hline \end{array}$

f $\begin{array}{r} 7096 \\ \times \quad 8 \\ \hline \end{array}$

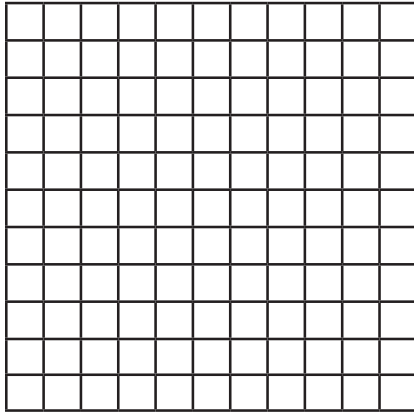


Multiply these.

a

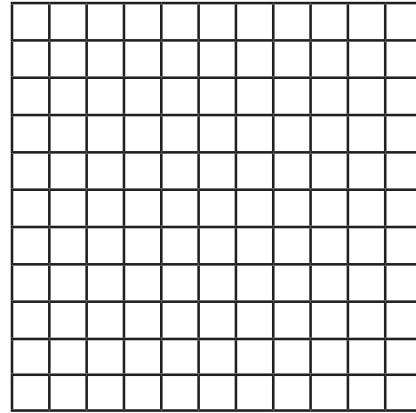
$42 \times 36 =$

1512



$24 \times 63 =$

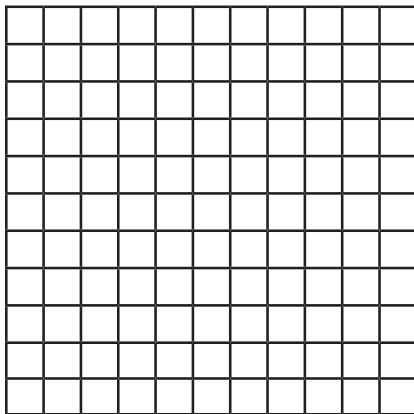
1512



b

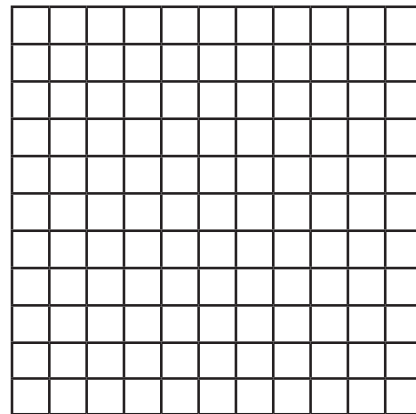
$84 \times 12 =$

1008



$48 \times 21 =$

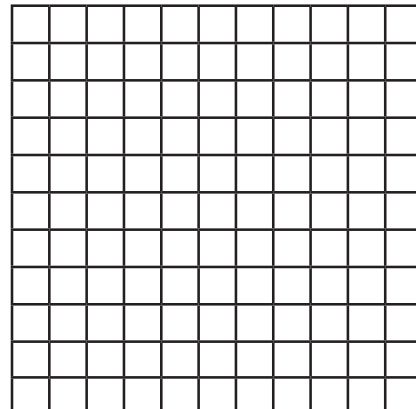
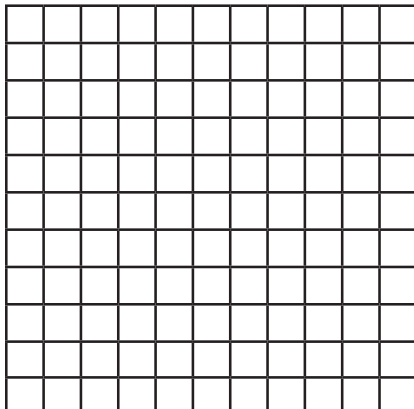
1008



c

What do you notice?

Try to make up your own pairs of calculations that do the same thing.

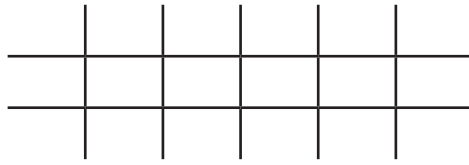




Answer these using the grid method.
Estimate first and check your answers.

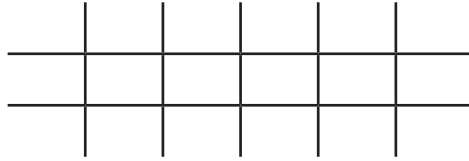
a $478 \times 19 =$

Estimate:



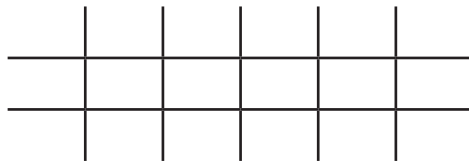
b $385 \times 28 =$

Estimate:



c $787 \times 36 =$

Estimate:



d $1325 \times 28 =$

Estimate:



e $4154 \times 34 =$

Estimate:



f $5078 \times 45 =$

Estimate:





Now use a long multiplication method to answer these.
Remember to show your working.

Compare the two methods. Which do you prefer?

a
$$\begin{array}{r} 478 \\ \times 19 \\ \hline \end{array}$$

9082

c
$$\begin{array}{r} 787 \\ \times 36 \\ \hline \end{array}$$

28332

e
$$\begin{array}{r} 4154 \\ \times 34 \\ \hline \end{array}$$

141236

b
$$\begin{array}{r} 385 \\ \times 28 \\ \hline \end{array}$$

10780

d
$$\begin{array}{r} 1325 \\ \times 28 \\ \hline \end{array}$$

37100

f
$$\begin{array}{r} 5078 \\ \times 45 \\ \hline \end{array}$$

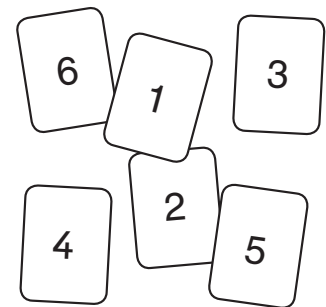
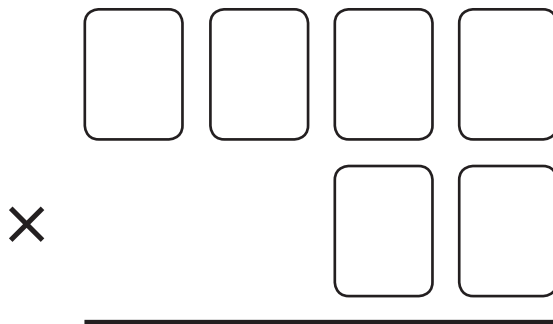
228510



YOU WILL NEED:

- digit cards 1–6

Use the digit cards 1, 2, 3, 4, 5 and 6.
Arrange them like this.



a What is the **largest** product you can make?

341523

b What is the **smallest** product you can make?

31928

c Try to find a product as **near** as possible to 50000?

54756

1

Write these remainders as **fractions**.

A number is divided by 4 and leaves a remainder of 2.

This is remainder $\frac{1}{2}$ as a fraction.

a A number is divided by 5 and leaves a remainder of 1.

This is remainder $\frac{1}{5}$ as a fraction.

c A number is divided by 8 and leaves a remainder of 6.

This is remainder $\frac{3}{4}$ as a fraction.

b A number is divided by 6 and leaves a remainder of 2.

This is remainder $\frac{1}{3}$ as a fraction.

d A number is divided by 9 and leaves a remainder of 6.

This is remainder $\frac{2}{3}$ as a fraction.

2

Answer these. Write the remainders as **fractions**.

a
$$\begin{array}{r} 222\frac{1}{2} \\ 4 \overline{) 890} \end{array}$$

c
$$\begin{array}{r} 174\frac{3}{5} \\ 5 \overline{) 873} \end{array}$$

e
$$\begin{array}{r} 1051\frac{1}{4} \\ 4 \overline{) 4205} \end{array}$$

b
$$\begin{array}{r} 142\frac{4}{5} \\ 5 \overline{) 714} \end{array}$$

d
$$\begin{array}{r} 227\frac{1}{5} \\ 5 \overline{) 1386} \end{array}$$

f
$$\begin{array}{r} 464\frac{3}{4} \\ 8 \overline{) 3718} \end{array}$$

3

Now complete these so that they have an answer that is a **decimal number**.

a
$$\begin{array}{r} 222.5 \\ 4 \overline{) 890} \end{array}$$

c
$$\begin{array}{r} 174.6 \\ 5 \overline{) 873} \end{array}$$

e
$$\begin{array}{r} 1051.25 \\ 4 \overline{) 4205} \end{array}$$

b
$$\begin{array}{r} 142.8 \\ 5 \overline{) 714} \end{array}$$

d
$$\begin{array}{r} 277.2 \\ 5 \overline{) 1386} \end{array}$$

f
$$\begin{array}{r} 464.75 \\ 8 \overline{) 3718} \end{array}$$



Answer these problems. Remember that the answer may need rounding up or down.

- a** A farmer collects 559 eggs. Each box holds 6 eggs. How many boxes are needed for all the eggs? 94
- b** 129 children turn up for a sponsored netball event. There are 7 players in a netball team. How many full teams can be made? 18
- c** A school has 324 children. The office wants to order enough pencils for one for each child. The pencils are sold in packs of 8. How many packs need to be ordered? 41
- d** The whole school is going on a trip to a castle. There are 483 children and adults in total. Coaches hold 50 people. How many coaches will be needed? 10



Answer these. Write the whole number remainders.

- a** $2519 \div 2 =$ 1259 r 1
- b** $2519 \div 3 =$ 839 r 2
- c** $2519 \div 4 =$ 629 r 3
- d** $2519 \div 5 =$ 503 r 4
- e** $2519 \div 6 =$ 419 r 5
- f** $2519 \div 7 =$ 359 r 6
- g** $2519 \div 8 =$ 314 r 7
- h** $2519 \div 9 =$ 279 r 8
- i** $2519 \div 10 =$ 251 r 9

The remainders are in order from 1 to 9 and all the remainders are one less than the divisor.

- What do you notice?
- Can you find any other numbers that have a pattern like this?

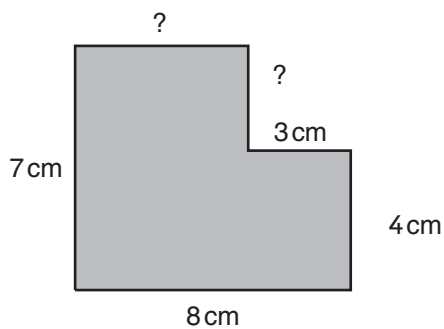


14a Finding perimeters

1

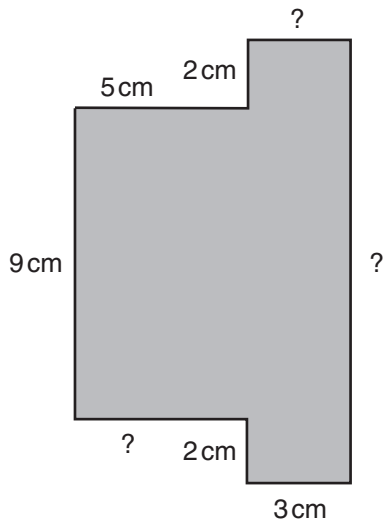
Write the missing lengths on these shapes. Then calculate the perimeter.

a



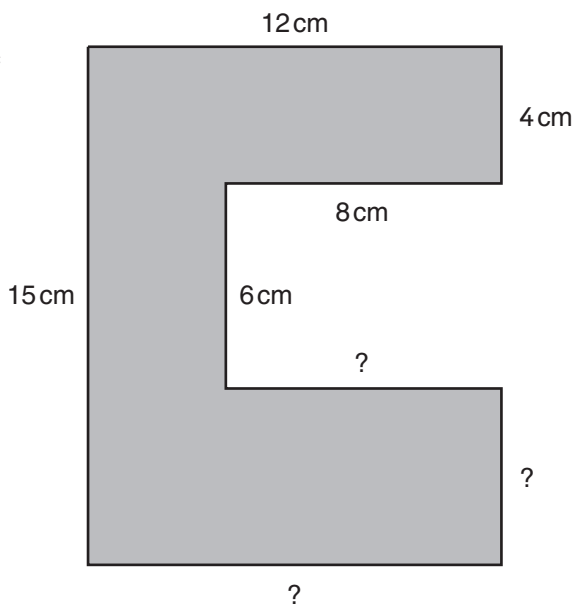
perimeter =

b



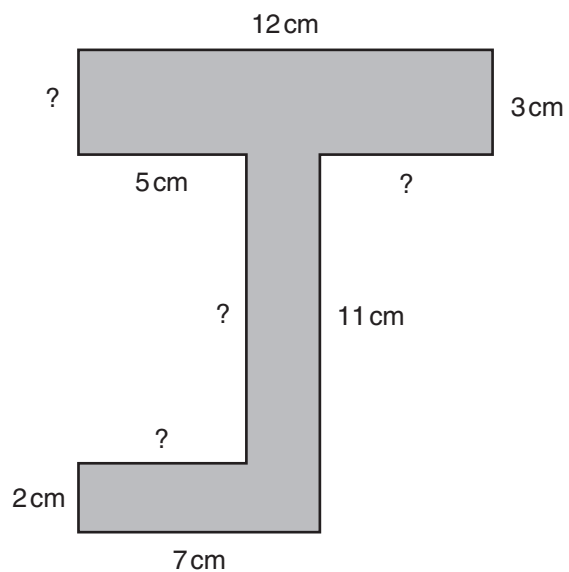
perimeter =

c



perimeter =

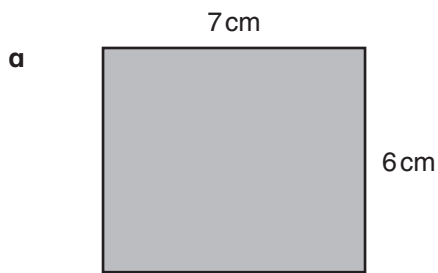
d



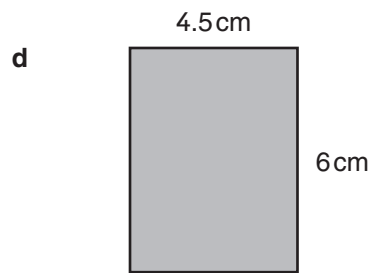
perimeter =

2

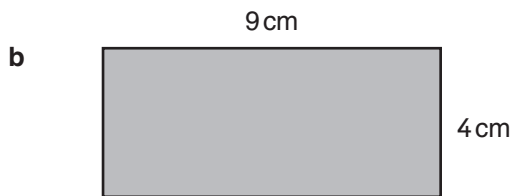
Calculate the perimeter of these rectangles.



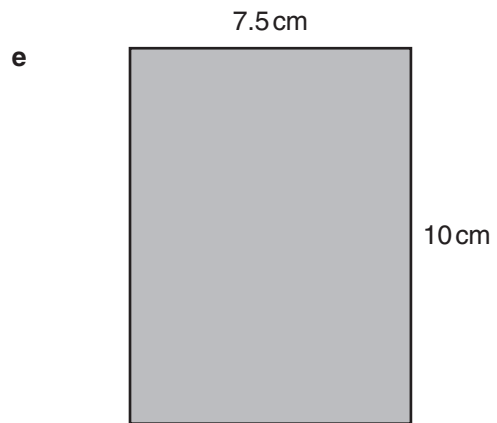
perimeter =



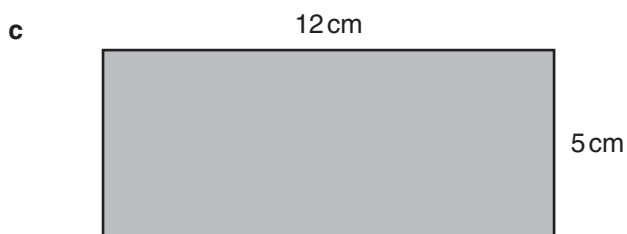
perimeter =



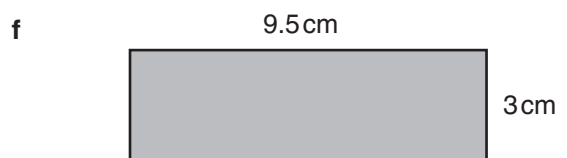
perimeter =



perimeter =



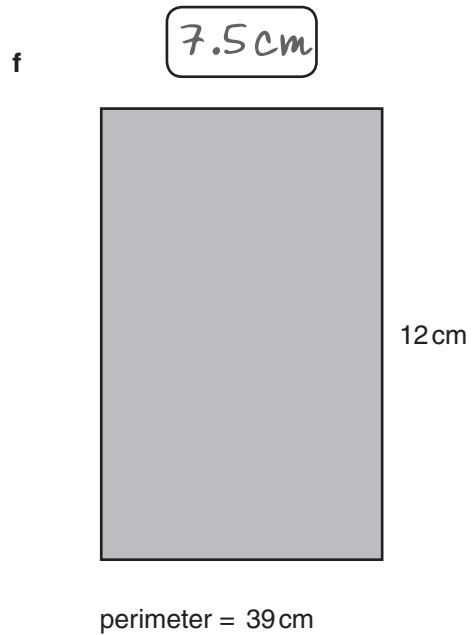
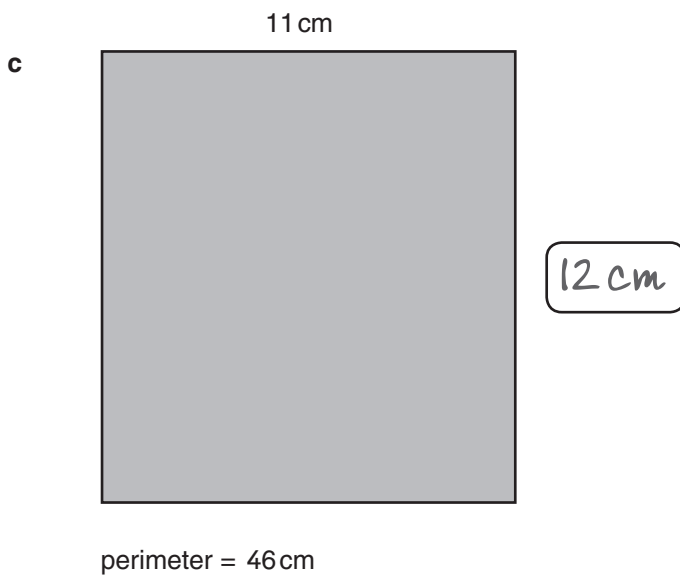
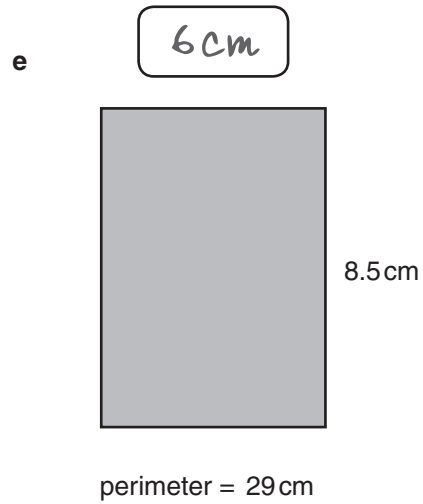
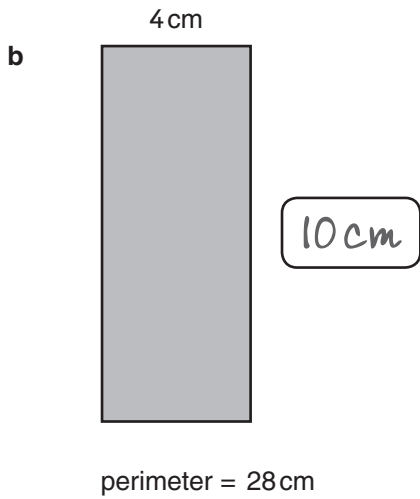
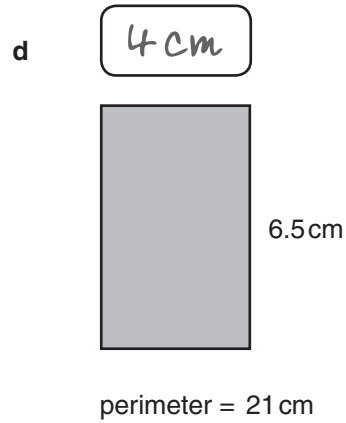
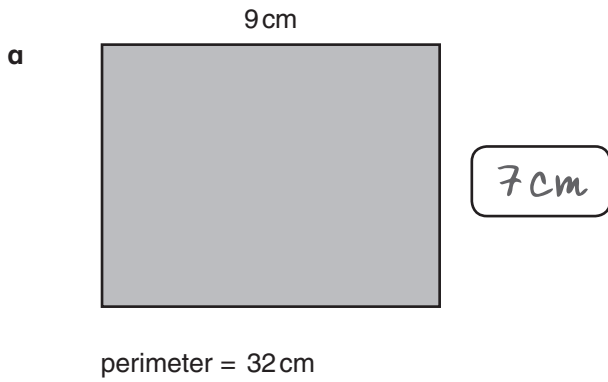
perimeter =



perimeter =

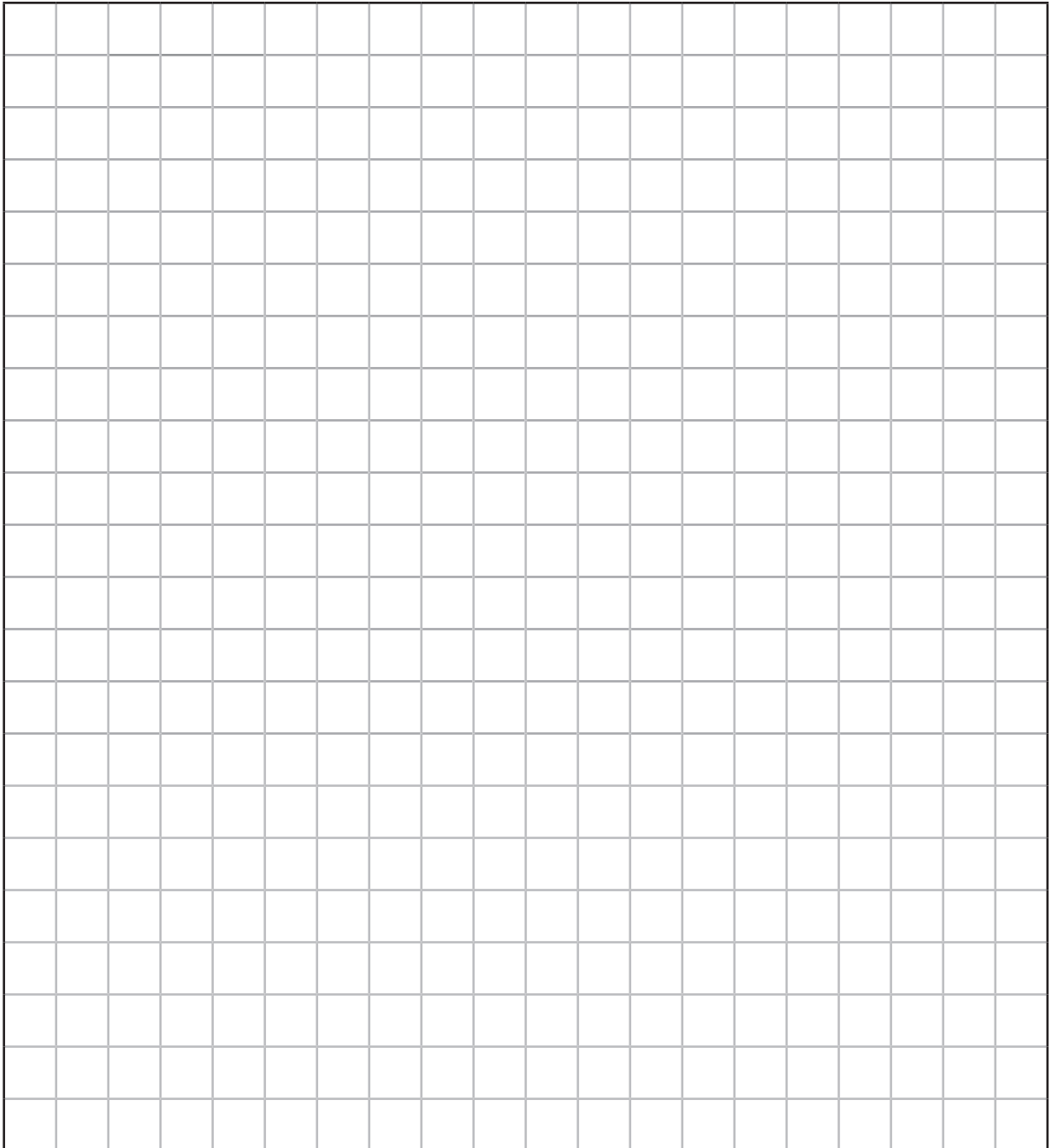
3

Calculate the length of the missing sides of these rectangles.





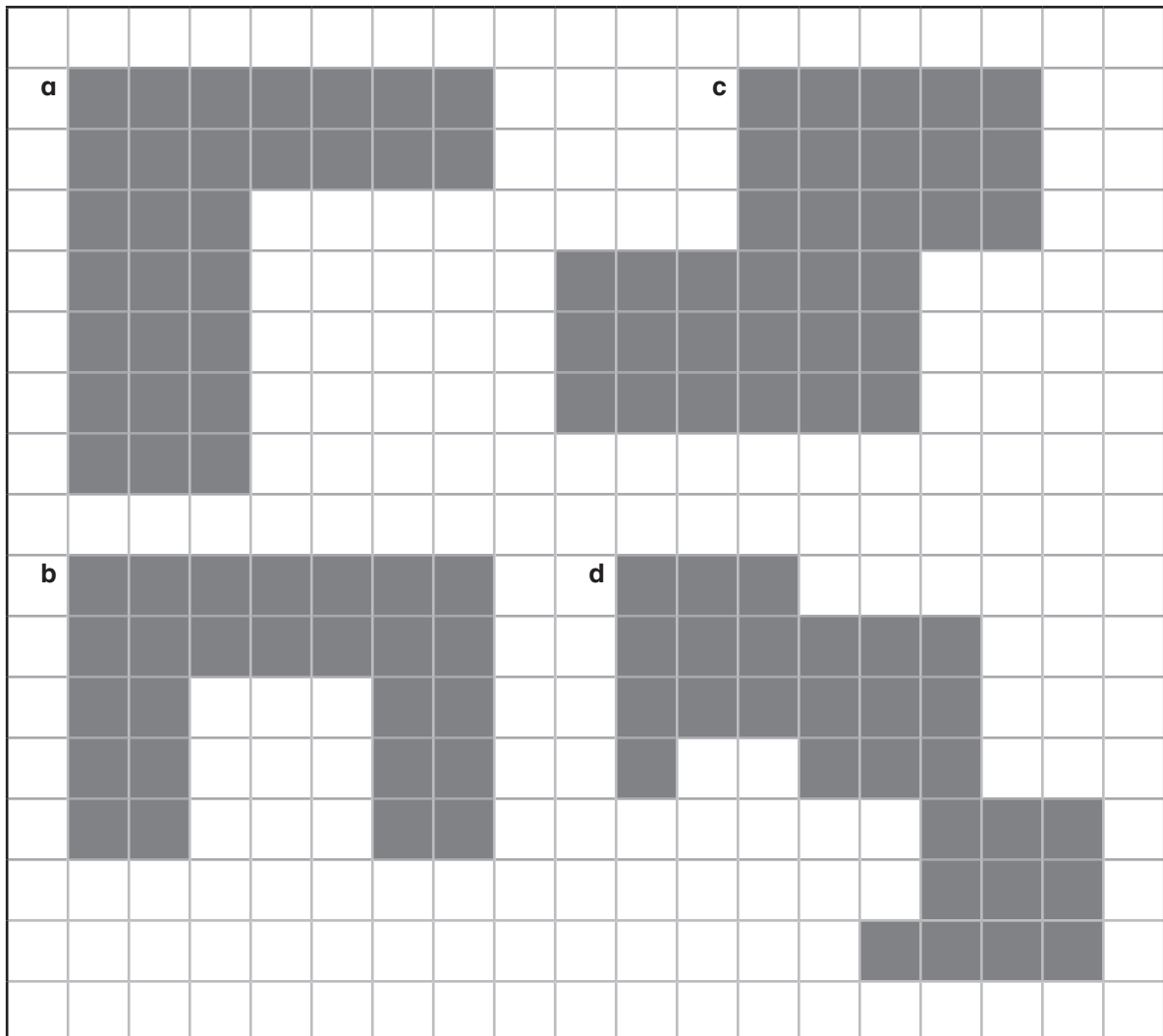
- Draw 4 different shapes on this grid, each with a perimeter of 22 cm. The shapes must be made from whole squares.
- Label the lengths of each of your sides.
- Count the number of squares to find the area of your shapes.
- Compare the areas. Which shape has the largest area?



Check four shapes have been drawn with correct lengths and areas labelled.



These shapes are drawn on a cm square grid. What is the area and perimeter of each of them?



Shape a

perimeter =

area =

Shape c

perimeter =

area =

Shape b

perimeter =

area =

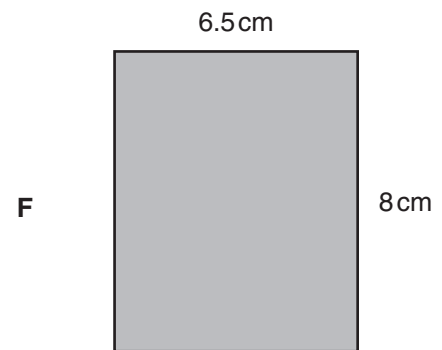
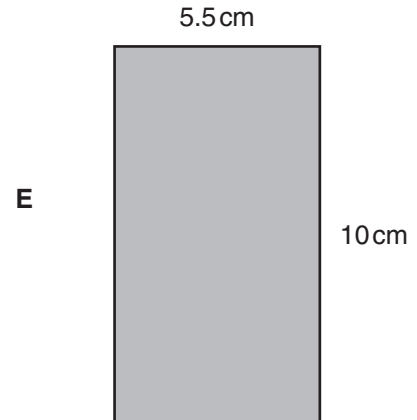
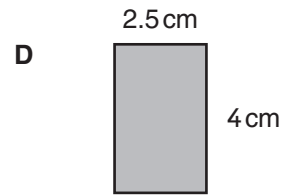
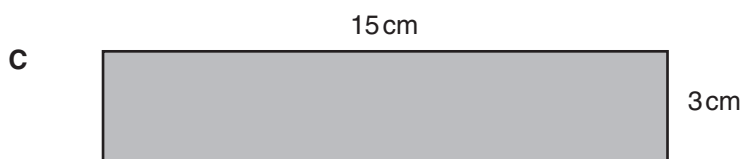
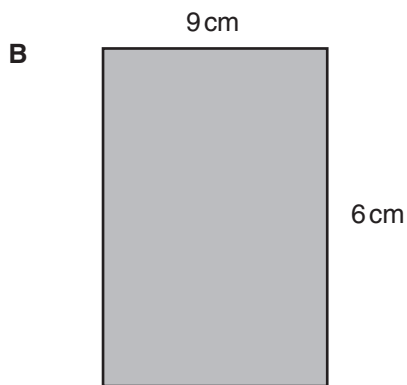
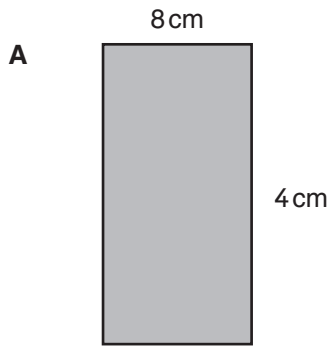
Shape d

perimeter =

area =



- a Calculate the area and perimeter of each of these rectangles.
Write them in the table below.



Rectangle	Length (cm)	Width (cm)	Perimeter (cm)	Area (cm ²)
A	8	4	24	32
B	6	9	30	54
C	15	3	36	45
D	2.5	4	13	10
E	5.5	10	31	55
F	6.5	8	29	52

- b Write formulae to find the perimeter and area of any rectangle, where a is the length and b is the width.

$$\text{perimeter} = 2 \times (a + b)$$
$$\text{area} = a \times b$$



Answer these.

- a The area of a rectangle is 54 cm^2 . The width is 9 cm. What is the length of the rectangle?
- b The perimeter of a rectangle is 20 cm. One of the sides is 6 cm. What is the area of the rectangle?
- c The area of a rectangle is 72 cm^2 . One of the sides is 6 cm. What is the perimeter of the rectangle?
- d The perimeter of a square is 48 cm. What is the area of the square?
- e The area of a square is 121 cm^2 . What is the perimeter of the square?

6 cm

24 cm^2

36 cm

144 cm^2

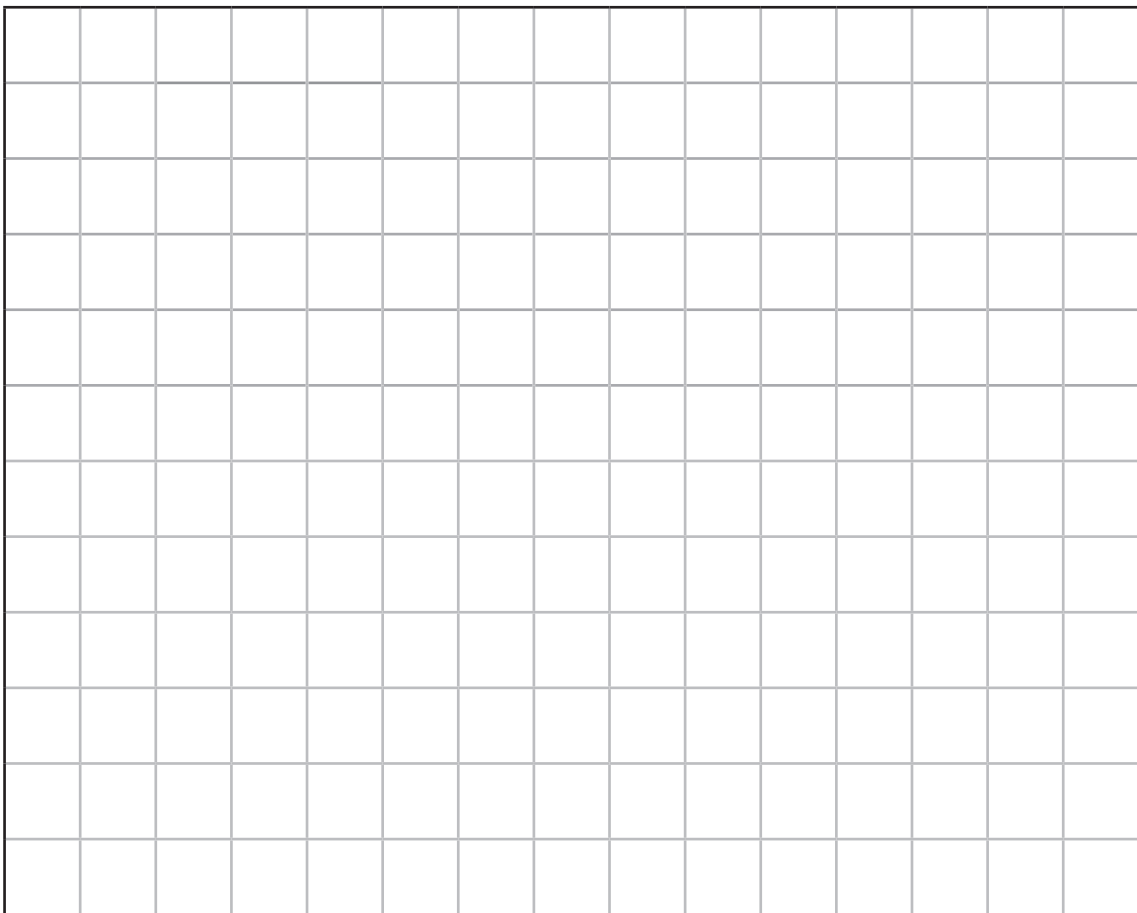
44 cm



'If a shape has a greater perimeter than another shape, then it will also have a greater area.'

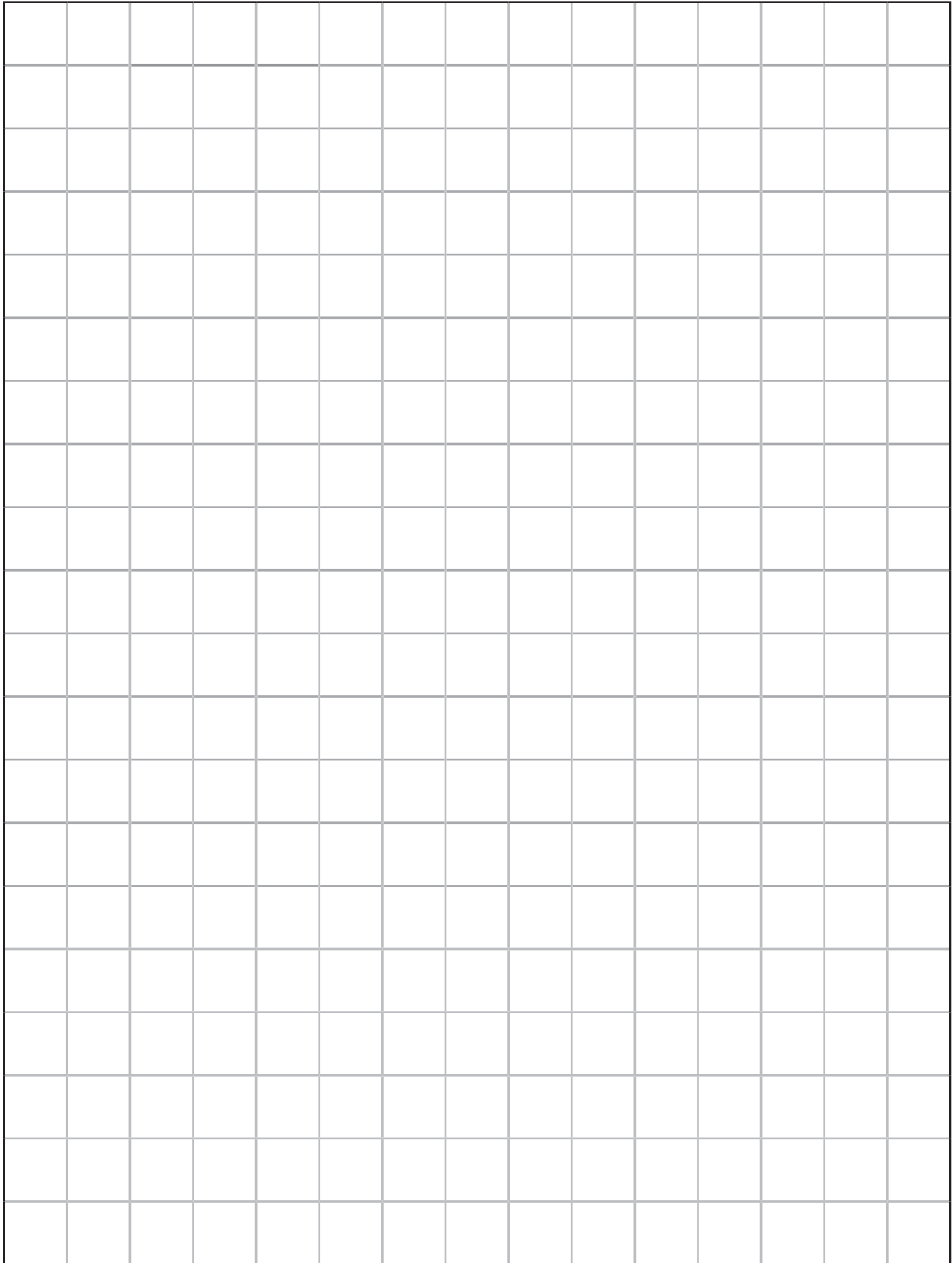
Is this ALWAYS, SOMETIMES or NEVER true? Circle your answer.

How can you prove this?



5

- Draw 4 different shapes on this grid, each with an area of 15 cm^2 . The shapes must be made from whole squares.
- Label the lengths of each of your sides.
- Calculate the perimeter of your shapes.
- Compare the perimeters. Which shape has the largest perimeter?



Check that each shape has an area of 15 cm^2

6

YOU WILL NEED:

- ruler

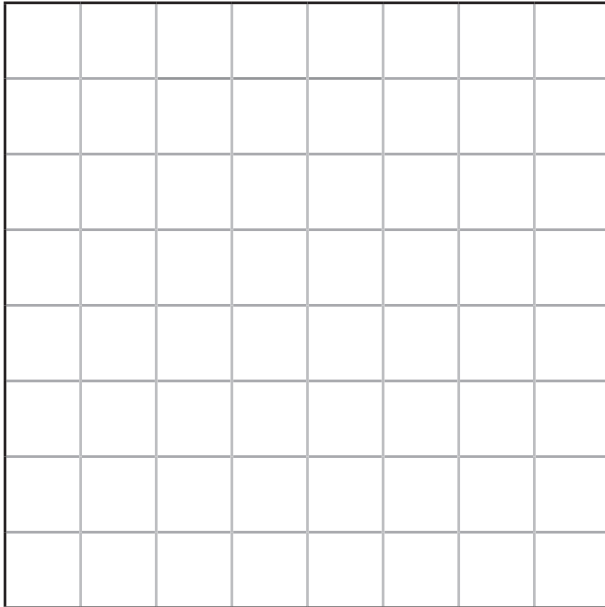
a Measure and calculate the perimeter and area of this rectangle.



perimeter =

area =

b Double the length of each side. Draw the rectangle on this grid.



perimeter =

area =

c How many times greater has the perimeter become?

d How many times greater has the area become?

Investigate this with other rectangles.



1

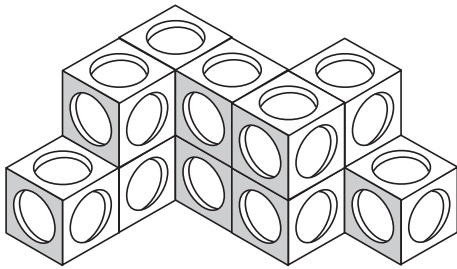
YOU WILL NEED:

- interlocking cubes

Make each of these shapes using centimetre cubes.

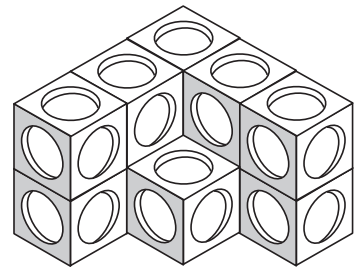
- a Write the **volume** of each shape.

A



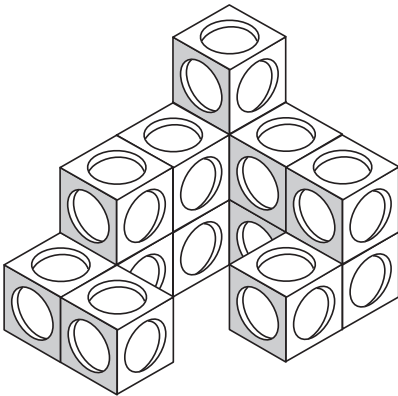
volume = cm^3

C



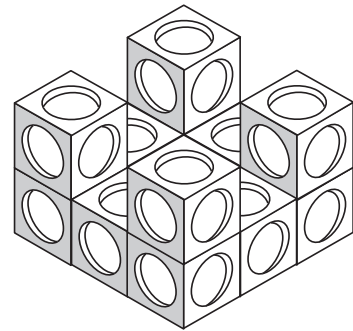
volume = cm^3

B



volume = cm^3

D



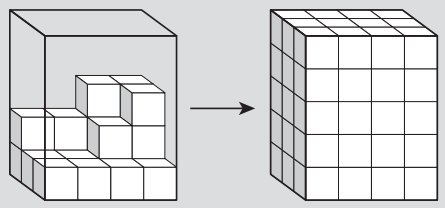
volume = cm^3

- b Which 2 models could you put together to make a volume of 24 cm^3 ?

and

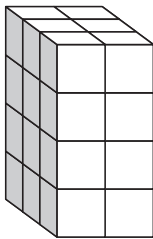
2

This box can hold 5 layers of cubes, with 12 cubes in a layer.
The volume of the box is 60 cm^3 .



Calculate the volumes of these boxes.

a

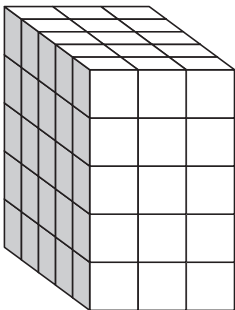


Number of cubes in a layer =

Number of layers =

Volume of box =

b

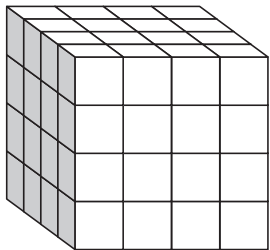


Number of cubes in a layer =

Number of layers =

Volume of box =

c

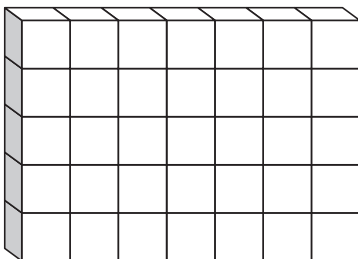


Number of cubes in a layer =

Number of layers =

Volume of box =

d

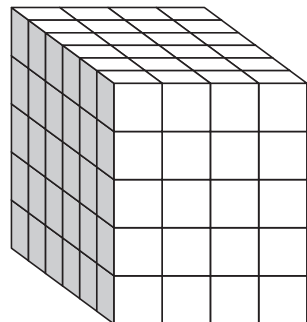


Number of cubes in a layer =

Number of layers =

Volume of box =

e



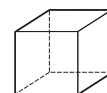
Number of cubes in a layer =

Number of layers =

Volume of box =

3

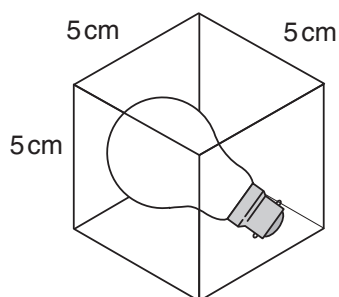
Complete this table showing the sizes of 5 cuboids.



Length (cm)	Width (cm)	Height (cm)	Volume (cm ³)
5	8	2	80
3	2	9	54
6	6	6	216
10	4	15	600
9	10	11	990

4

A single light bulb is sold in a cube container to protect it. The container has a height of 5 cm, a width of 5 cm and a length of 5 cm.



The volume of the container is 125 cm³

The light bulbs are transported in a cuboid box which holds 60 bulbs.

The volume of the box is 7500 cm³

Explore the different shapes the box could be to hold the 60 light bulbs.

Use interlocking cubes to help you.

Number of bulbs long	5	4	5	5	6
Number of bulbs wide	2	3	3	4	5
Number of bulbs high	6	5	4	3	2

As a challenge, use the table above to help you work out the possible length, width and height of the box. Remember the bulb is in a 5 cm × 5 cm × 5 cm cube. You can then check this matches the volume of the box.

Length (cm)	Width (cm)	Height (cm)	Volume (cm ³)
25	10	30	7500
20	15	25	7500
25	15	20	7500
25	20	15	7500
30	25	10	7500