S2 Block Test One
Revision Booklet
MP2

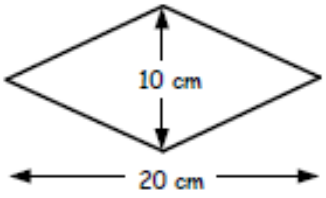
Area of Quadrilaterals

Exercise 3

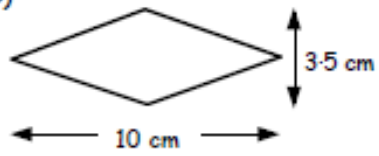
1. Write down the formula for the area of a Rhombus or Kite.

2. Use your formula to calculate the area of each shape.

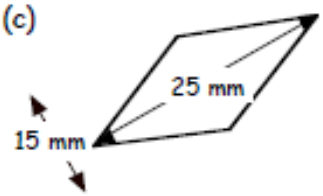
(a)



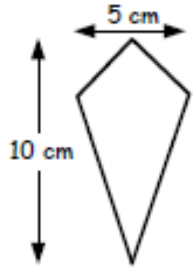
(b)



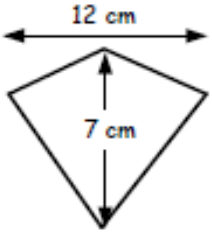
(c)



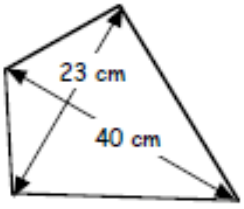
(d)



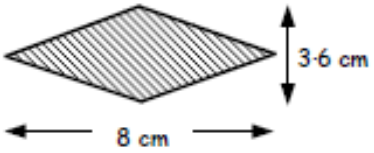
(e)

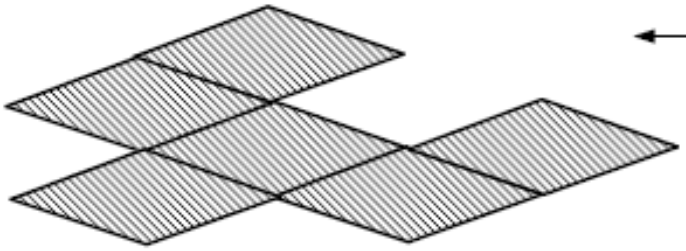


(f)



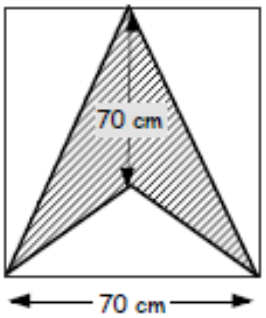
3. Six identical silver rhombi (like the one shown) are made into a pendant below.





Find the total area of the pendant.

4. Calculate the shaded area of the V-kite shown. →



5. A rhombus has the **same area** as the V-kite in question 4.
If the rhombus has one diagonal length of 100 centimetres,

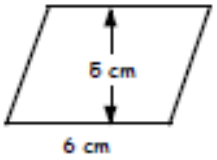
Area of Quadrilaterals

Exercise 4

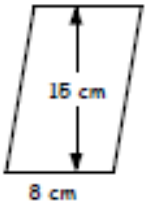
1. Write down the formula for the area of a parallelogram.

2. Calculate the area of each parallelogram below :-

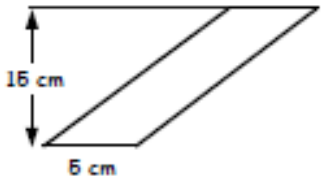
(a)



(b)

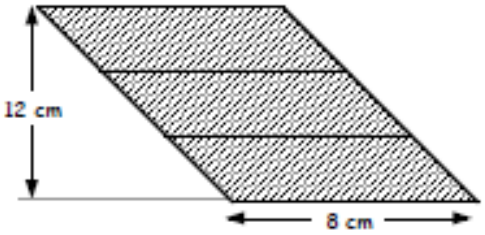


(c)



3. Three identical parallelograms are put together as shown.

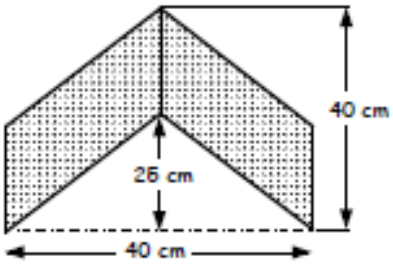
   Find the area of **one** of the parallelograms.



4. A large parallelogram has an area of 125 square centimetres.

   If the parallelogram has a height of 10 centimetres, find the length of its base.

5.



An "ARROW" sign is formed from 2 identical parallelograms.

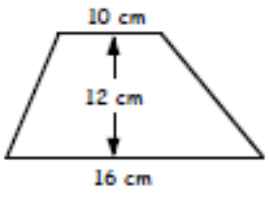
Calculate the area of the sign.

Exercise 5

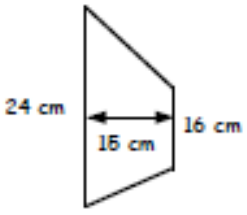
1. Write down the formula for the area of a trapezium.

2. Use the formula to calculate the area of each trapezium below :-

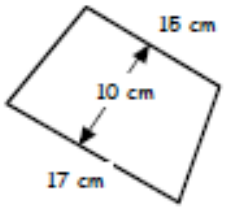
(a)



(b)



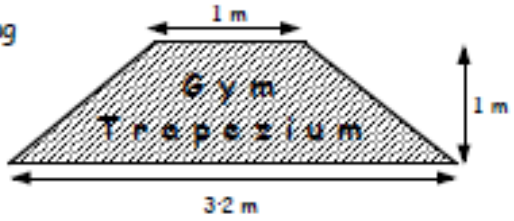
(c)



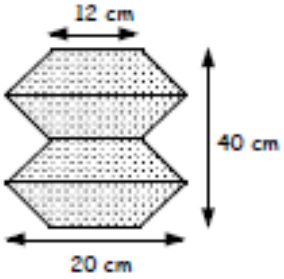
Area of Quadrilaterals

3. *At the Gym Trapezium*, a sign has been hung over the doorway with dimensions shown.

   Calculate the area of the sign.



4.

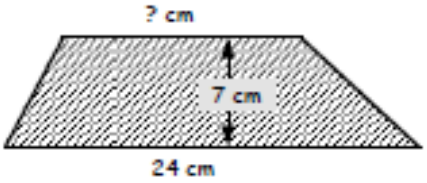


Four identical trapezia are joined together as shown for a company logo.

Calculate the area of the sign.

5. The area of the trapezium shown is 154 cm^2.

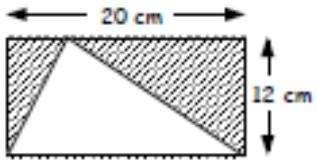
   Calculate the length of the missing dimension.



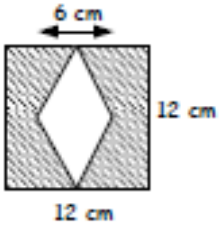
Exercise 6

For each shape below, use an appropriate formula and calculate the **shaded** areas :-
(Show <u>all</u> your formulae and working)

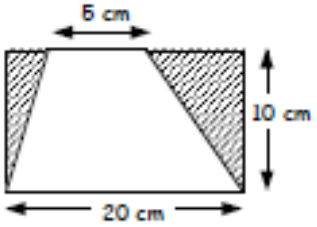
1.



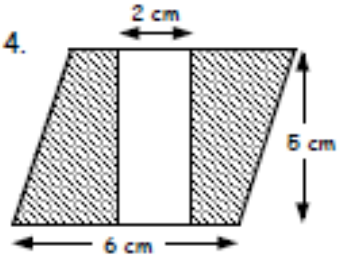
2.



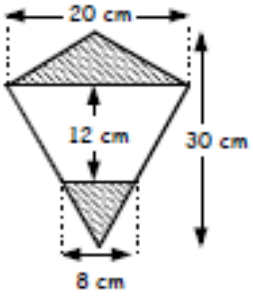
3.



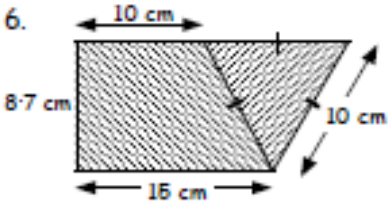
4.



5.



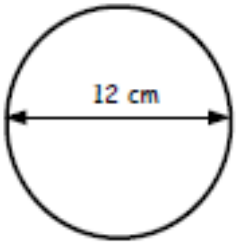
6.



The Circle

Exercise 1

1. Calculate the circumference of this circle with diameter 12 cm.



Copy and complete : -

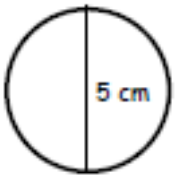
$\Rightarrow \quad C = \pi D$

$\Rightarrow \quad C = 3{\cdot}14 \times 12$

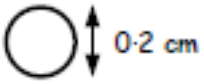
$\Rightarrow \quad C =$ ..... cm.

2. Showing 3 lines of working for each case, calculate the circumference of each of these circles :-

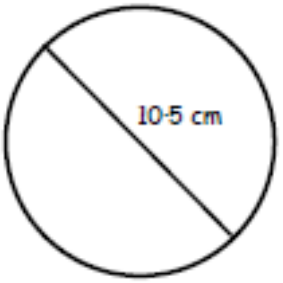
(a)



(b)



(c)



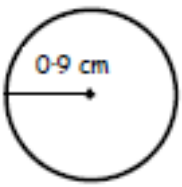
3.

Calculate the circumference of the alloy wheel-trim shown opposite.

4. Calculate the circumference of each of these circles, showing your 3 lines of working each time :-

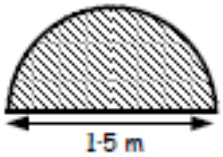
(a)

(b)



(c)

5.

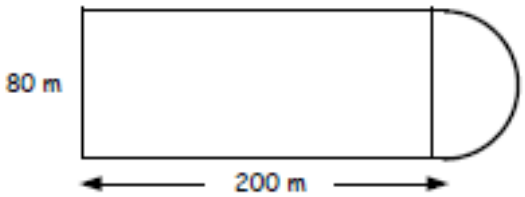


A semi-circular doorstep has a diameter of 1·5 metres.

Calculate the perimeter of the doorstep.

6. Calculate the perimeter of both shapes :-

(a)



(b)

The Circle

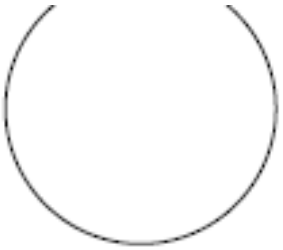
1. Find the diameter of the circle with circumference 78·5 cm.

   Copy and complete :-

$$D = \frac{C}{\pi}$$

$$\Rightarrow \quad D = \frac{78{\cdot}5}{3{\cdot}14}$$

$$\Rightarrow \quad D = \ldots\ldots \text{ cm}$$



$C = 78{\cdot}5$ cm

2. Calculate the diameter of each circle below :-
   (You **must** set down 3 lines of working)

(a)

$C = 25{\cdot}12$ cm

(b)

$C = 1{\cdot}57$ cm

(c)

$C = 59{\cdot}66$ cm

3. For a circle with circumference 69·08 cm, calculate its :-

   (a) diameter (b) radius.

4. The circumference of a tyre from a child's toy motorbike is 7·85 centimetres.

   Find the radius of the tyre.

5. This CD has an outer circumference of 40 centimetres.
   The hole has a 0·5 centimetre radius.

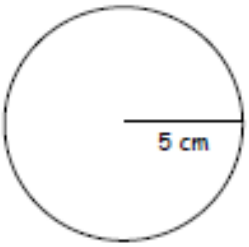
   Calculate :-

   (a) the radius of the CD.

   (b) the circumference of the hole.

The Circle

1. Find the area of a circle with radius 5 cm.



COPY and complete :-

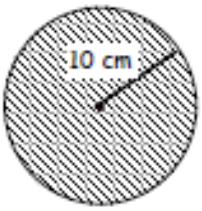
$A = \pi r^2$

$\Rightarrow \quad A = 3{\cdot}14 \times 5 \times 5$

$\Rightarrow \quad A = \ldots\ldots \text{ cm}^2$

2. Calculate the area of each circle below :-
(You **should** set down 3 lines of working)

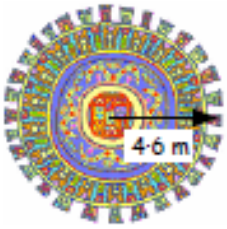
(a)



(b)

radius = 22·5 mm

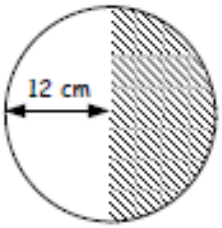
3. Calculate the area of the circular carpet shown.
It has a radius of 4·6 metres.
(Round your answer to 1 dec. pl.)



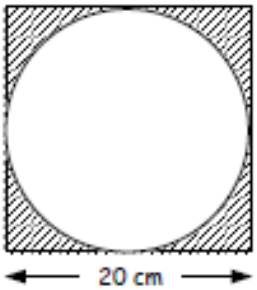
4.

Work out the area of this coloured counter which has diameter 1·8 metres. (Round your answer to 2 dec. pl.)

5. This circular sign has been split into 2 semi-circles.
If the radius of the circle is 12 cm, find the area of the shaded part of the circle.



6.

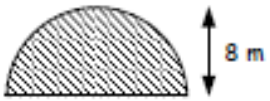


Calculate the **total** shaded area here.

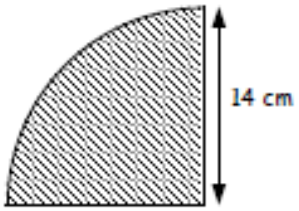
The Circle

1. Calculate the area of these shapes :-

(a)

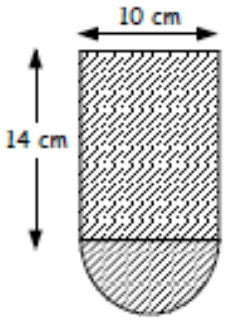


(b)

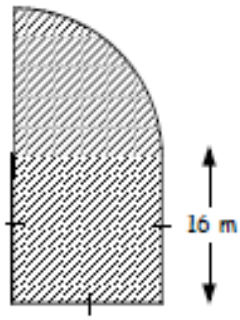


2. Calculate the area of these shapes :-

(a)

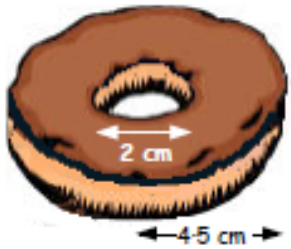


(b)

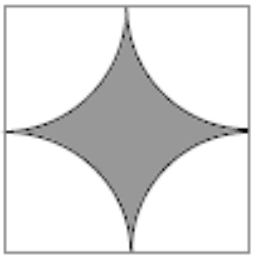


3. This doughnut has an outer radius of 4·5 cm and the hole in the centre has a diameter of 2 cm.

Calculate the (approximate) area of chocolate required to cover the top part of the doughnut.



4.



A square with side 20 centimetres has four identical quarter circles cut out from each corner as shown.

Work out the shaded area.

5. A circular trampoline has a circumference of 10·99 m.

Calculate its area, to the nearest m^2.

Speed Distance Time

Exercise 3

1. Copy and complete the formula for calculating speed :- $S = \frac{D}{\ldots\ldots}$.

2. Use your formula to calculate the following speeds :-
   (a) A car travels 180 kilometres and takes 3 hours.
   (b) A plane flying for 8 hours and travelling 3200 miles.
   (c) A bird flying 20 kilometres and taking 2 hours.

3. A train has to make a journey of 200 kilometres.
   How fast would it need to travel to complete the journey in :-
   (a) 2 hours (b) 4 hours (c) 5 hours (d) $\frac{1}{2}$ hour ?

4. A car travelled 60 kilometres.
   If the journey only took 30 minutes, calculate the speed in km/hr.

Exercise 4

1. Copy and complete the formula to calculate the distance travelled :- $T = \frac{D}{\ldots\ldots}$.

2. Use your formula to calculate the time taken for each of the following :-
   (a) A car travels 240 kilometres at 60 km/hr.
   (b) A jet travels 2000 miles at a speed of 500 m.p.h.
   (c) A cat running at 4 metres/sec and covers 26 metres.

3. Change the following times into hours and minutes :-
   (a) $3\frac{1}{2}$ hours (b) $4\frac{3}{4}$ hours (c) $2\frac{1}{3}$ hours (d) 6·25 hours.

4. Change the following times to decimal form :-
   (a) 1 hr 30 mins (b) 45 mins (c) 4 hrs 15 mins (d) 6 hrs 40 minutes.

5. Calculate the time taken (in hours and minutes) to :-
   (a) drive 120 km at 80 km/hr
   (b) run 20 miles at 8 m.p.h.
   (c) fly 1000 km at 300 km/hr
   (d) cruise 200 miles at 30 m.p.h.
   (e) race 400 km at 120 km/hr
   (f) walk 46 miles at 5 m.p.h.

Speed Distance Time

Exercise 5

1. Find the unknown quantity in each of the following :-

   (a) Distance = ? km. Speed = 20 km/hr. Time : $3\frac{1}{2}$ hours.

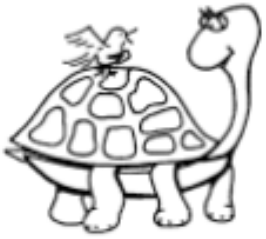
   (b) Distance = 90 miles. Speed = ? m.p.h. Time : $1\frac{1}{2}$ hours.

   (c) Distance = 100 km. Speed = 40 km/hr. Time : ? hours.

2. (a) A tortoise walks at 2 metres per minute.
   How long will it take to walk 9 metres ?

   (b) Addison can sprint at 4 metres per second.
   How far will he travel in ten and a half seconds ?

   (c) A bus journey, 60 kilometres long, takes one and a half hours.
   How fast is the bus travelling ?



3. A jet has a 400 mile journey to complete.
   How long would it take at a speed of :-
   (a) 200 m.p.h. (b) 800 m.p.h. (c) 600 m.p.h. ?

4. 

   Jane ran round a 1500 metre track and took 6 minutes.
   (a) At what speed in metres per minute was Jane running ?
   (b) Bob beat Jane's time by a minute.
   What was Bob's speed ?

5. A rocket ship is 4200 km from Earth.
   The rocket then travels away from Earth at its maximum speed of 2400 km/hr for $4\frac{1}{2}$ hours.
   (a) How far away from Earth is the spaceship now ?
   (b) How quickly can the spaceship then return to Earth, travelling at its maximum speed ?

6. Ryan cycled from home to school (8 km) at a speed of 16 km/hr. He had to walk home from school due to a puncture.
   If Ryan walked at a speed of 6 km/hr, how much quicker was he cycling than walking ?

Speed Distance Time

Exercise 6

1. Change the following to decimals of an hour :-

   (a) 45 minutes (b) 24 minutes (c) 36 minutes (d) 27 minutes.

2. Change the following to decimals of a hour giving your answer to two decimal places :-

   (a) 7 minutes (b) 40 minutes (c) 8 minutes (d) 124 minutes.

3. Change each time to decimal form :-

   (a) 2 hrs 33 mins (b) 1 hr 48 mins (c) 5 hrs 6 mins (d) 3 hrs 3 mins.

4. Calculate the unknown quantity in each of the following :-

   (a) Distance = ? km Speed = 80 km/hr Time : 2 hrs 45 mins.

   (b) Distance = 70 miles Speed = ? m.p.h. Time : 1 hr 24 mins.

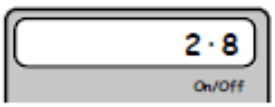
   (c) Distance = 420 km Speed = 50 km/hr Time : ? hrs ? mins .

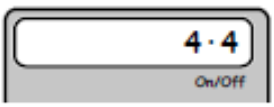
5. The distance between two towns Hurley and Burley is 48 kilometres. Gerry drives a truck from Hurley to Burley at a speed of 30 km/hr. On the return trip he increases his speed by 6 km/hr.

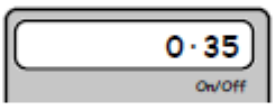
   How much faster was the return trip ?

Exercise 7

1. Change the calculator displays (shown in hours) to hours and minutes :-

   (a) 

   (b) 

   (c) 

2. Change each of the following to hours and minutes :-

   (a) 4·6 hours (b) 8·15 hours (c) 3·05 hours (d) 1·125 hours.

3. Calculate the time taken in hours and minutes for the following journeys :-

   (a) A rally car travelling 150 kilometres at 40 km/hr.

   (b) A marathon runner (26 miles) at a speed of 12 m.p.h.

   (c) A speed boat at 40 km/hr travelling 36 kilometres.

4. Change each of the following speeds to km/hr :-

   (a) 20 m/sec (b) 250 m/sec (c) 10·5 m/sec (d) 50 cm/min.

Equations

Exercise 4

1. Find the value of each of the following when $a = 1$, $b = 2$, $c = 3$ and $d = 4$:-

(a) $2a$ (b) $4c$ (c) $2d + 1$ (d) $a + b + c + d$

(e) $2a + 3c$ (f) $5b - 2d$ (g) $3a + 2b + c - 2d$ (h) $ab + cd$

(i) $4ab + d - 2abc$ (j) $(a + c)^2$ (k) $a^2 + b^2 + c^2$ (l) $(a + b - c)^2$

(m) $(c - d)^3$ (n) $\sqrt{(c^2 + d^2}$ (o) $2abc \div d$ (p) $a + d(bc - ab)$.

2. Find the value of each of the following when $e = -1$, $f = 3$, $g = -2$ and $h = 2$:-

(a) $5e + f$ (b) $3f + 2g - h$ (c) $3e + 2f - 3g$ (d) $ef + gh$

(e) $2fg + e^3$ (f) $(eh - gf)^2$ (g) $e^2 - h^2 - g^2 + f^2$ (h) $3(2e + f) + 2h^2$

(i) $\frac{1}{2}(h + e)^2$ (j) $2efgh$ (k) $e^2(f^2 - h^2)$ (l) $fg(3e - 5g) \div eh$.

Exercise 5

1. Copy and factorise :-

(a) $3a + 6 = 3(\ldots + \ldots)$ (b) $8g - 20 = 4(\ldots - \ldots)$ (c) $10y + 25x = 5(\ldots + \ldots)$

(d) $ab + 4a = a(\ldots + \ldots)$ (e) $2kg + 2kp = 2k(.. + ..)$ (f) $6b + 9b^2 = 3b(\ldots + \ldots)$.

2. Factorise :-

(a) $2a + 4$ (b) $3x + 12$ (c) $5k - 40$ (d) $6p + 6q$

(e) $12x + 15$ (f) $16y + 24$ (g) $24k - 15$ (h) $9a + 21b$

(i) $3x + 9y + 6$ (j) $4d + 6e + 10f$ (k) $12w + 30h - 18$ (l) $15q - 45p + 75m$.

3. Factorise fully :-

(a) $3ab + 21b$ (b) $12cd + 15c$ (c) $30pqr - 24pq$

(d) $5x - 15xy + xz$ (e) $x^2 + 4x$ (f) $3y^2 + 6y$

(g) $8x^2 + 4x$ (h) $12y - y^2$ (i) $x^2 + x$

(j) $12x^2 + 4x$ (k) $x^3 + x$ (l) $y^3 + y^2 + y$.

Equations

Exercise 1

1. **Copy** each equation and solve it to find the value of x :-

   (a) $x + 9 = 15$ (b) $x + 11 = 11$ (c) $x - 8 = 4$

   (d) $x - 18 = 0$ (e) $x - 60 = 20$ (f) $x + 8 = 3$

   (g) $x + 19 = 0$ (h) $3 + x = 5$ (i) $22 + x = 1$.

2. **Copy** each equation and solve it to find the value of the letter :-

   (a) $2m = 26$ (b) $7k = 0$ (c) $4x = 2$

   (d) $8u = 12$ (e) $8v = 18$ (f) $15p = 10$.

3. Find the value of x in the following equations (*Show each step of working carefully*).

   (a) $4x + 1 = 21$ (b) $3x + 5 = 29$ (c) $9x - 3 = 15$

   (d) $7x - 6 = 29$ (e) $6x - 12 = 0$ (f) $5x - 1 = 44$

   (g) $9x - 20 = 34$ (h) $3x + 42 = 87$ (i) $2x - 7 = 32$

   (j) $9x + 9 = 0$ (k) $2x - 19 = 0$ (l) $3x + 5 = -7$.

Exercise 2

1. Solve the following equations :-

   (a) $5x + 3 = 3x + 5$ (b) $8x + 9 = 7x + 17$ (c) $7x - 1 = 3x + 15$

   (d) $5x - 3 = 2x + 18$ (e) $12x - 5 = 8x + 7$ (f) $10x - 1 = 8x + 6$

   (g) $6x + 4 = 3x + 4$ (h) $9x - 1 = 4x + 34$ (i) $7x - 8 = x + 1$.

2. Solve for x :-

   (a) $4x = 3x + 8$ (b) $4x = x + 18$ (c) $9x = 4x + 45$

   (d) $10x = 9x + 41$ (e) $3x = x + 17$ (f) $5x - 26 = 3x$

   (g) $7x - 48 = x$ (h) $3x + 17 = x$ (i) $10x - 30 = 6x$.

Equations

Exercise 4

Solve each of these equations, by first of all multiplying **every term** by the l.c.m. of all the fractional denominators :-

1. $\frac{1}{2}x - 3 = 1$
2. $\frac{1}{4}x + 7 = 10$
3. $\frac{1}{8}x - 5 = 0$
4. $\frac{2}{3}x - 1 = 9$
5. $1 + \frac{3}{5}x = 13$
6. $\frac{3}{8}x + 4 = 4$
7. $\frac{3}{4}x - \frac{1}{2} = 7$
8. $\frac{1}{2}x + \frac{1}{3} = 4$
9. $\frac{4}{5}x - \frac{1}{4} = 0$
10. $\frac{1}{2}x - 5 = \frac{1}{4}$
11. $\frac{2}{3}x - 1 = \frac{1}{6}$
12. $\frac{3}{4}x - 1 = \frac{1}{5}$
13. $\frac{1}{2}x + 1 = \frac{1}{3}x + 4$
14. $\frac{3}{4}x - 4 = \frac{3}{5}x - 1$
15. $1 + \frac{5}{8}x = \frac{1}{4}x + 10.$

Exercise 5

Multiply each term by the l.c.m. of the denominators to dispose of the fractions and solve :-

1. $\frac{x + 1}{4} = 3$
2. $\frac{x + 4}{5} = 4$
3. $\frac{x + 2}{3} - 2 = 5$
4. $8 - \frac{x - 5}{3} = 0$
5. $\frac{2}{3}(6x + 3) - 22 = 0$
6. $\frac{3}{4}(5x - 1) - 7 = 3\frac{1}{2}$
7. $\frac{5}{8}(x + 3) - \frac{1}{2}x = 2$
8. $\frac{2}{5}(6x - 1) - \frac{1}{3}x = 12$
9. $2 + \frac{3}{10}(2x + 6) = \frac{1}{3}x + 7$
10. $\frac{2}{3}(2x + 4) + \frac{1}{2}(x - 3) = 14$
11. $\frac{x - 1}{5} + \frac{x + 2}{3} = 1$
12. $\frac{2x - 1}{4} - \frac{x + 6}{3} = 0.$

Sci Not

Exercise 1

1. Copy and complete the following :-

$39\,000 = 3900 \times 10 = 390 \times \ldots. \times \ldots. = 39 \times \ldots. \times \ldots. \times \ldots.$

$= 3{\cdot}9 \times \ldots\ldots\ldots\ldots$ (Stop here, since 3·9 lies between 1 and 10).

$= 3{\cdot}9 \times 10^{\ldots}$

2. Using the same method as Qu 1., write the following numbers in scientific notation :-

(a) 4800	(b) 6780	(c) 31 000
(d) 35 200	(e) 54 350	(f) 970 000
(g) 487 000	(h) 109 100	(i) 4 400 000.

Exercise 2

1. Using the "quick" method, write the following numbers in scientific notation :-

(a) 49 000	(b) 547 000	(c) 234 000
(d) 660	(e) 1482	(f) 9000
(g) 70 000	(h) 1 680 000	(i) 47 300 000.

2. You have learned that :- 3 million $= 3\,000\,000 = 3{\cdot}0 \times 10^{6}$

1·27 million $= 1\,270\,000 = 1{\cdot}27 \times 10^{6}$

Write out each of the following in full, then write each in scientific notation :-

(a) 7 million $= 7\,000\,000 = 7{\cdot}0 \times 10^{\ldots}$

(b) 2·5 million	(c) 9·19 million	(d) $4\frac{1}{2}$ million
(e) 17 million	(f) 27 million	(g) 2·8 million
(h) 1·97 million	(i) $12\frac{1}{2}$ million	(j) $15\frac{1}{2}$ million
(k) 5·714 million	(l) $5\frac{1}{4}$ million	(m) $6\frac{3}{4}$ million.

Sci Not

3. This table gives the areas of various stretches of water throughout the world.
Write each of the areas in scientific notation.

Sea / Ocean	Area (km^2)
Pacific Ocean	165 380 000
Atlantic Ocean	82 ·21 million
Indian Ocean	73·6 million
Mediterranean	2 510 000
River Clyde	2 130
Loch Ness	56
English Channel	103 600

Nessie ?

4. A golf caddie earns £250 000 per annum.

Write his earnings in scientific notation.

5. 

The population of Canada in May 2004 was 31 million and 629 thousand.

Write this number in scientific notation.

Exercise 3

1. Change each of the following from scientific notation to number form :-

(a) $3{\cdot}8 \times 10^4$ (b) $7{\cdot}5 \times 10^2$ (c) $3{\cdot}24 \times 10^5$ (d) $6{\cdot}47 \times 10^3$

(e) $1{\cdot}478 \times 10^4$ (f) 3×10^1 (g) 9×10^6 (h) $2{\cdot}9 \times 10^6$

(i) $6{\cdot}014 \times 10^4$ (j) 7×10^7 (k) $5{\cdot}37 \times 10^7$ (l) $8{\cdot}888 \times 10^8$.

2.

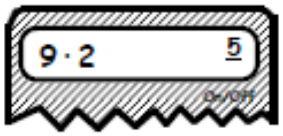
Player	Valuation
Figo	£$1{\cdot}525 \times 10^7$
Woodgate	£$5{\cdot}75 \times 10^6$
Novo	£$8{\cdot}755 \times 10^5$
Coyle	£$3{\cdot}285 \times 10^4$
McCracken	£$1{\cdot}004 \times 10^2$

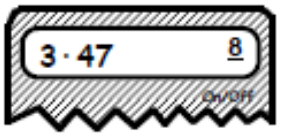
This table shows the valuation of certain football players as of June 2004.

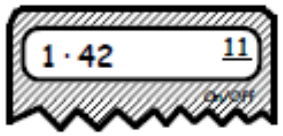
Write out each of the valuations in full.

Sci Not

3. What large numbers are shown on the calculators below ?

(a) 

(b) 

(c) 

4. Write the amount, £1 billion :-

(a) as a very large number in figures.

(b) in scientific notation.

Exercise 4

1. Write the following small numbers in scientific notation :-

(a) 0·003 (b) 0·000074 (c) 0·0286 (d) 0·000006

(e) 0·000482 (f) 0·287 (g) 0·00393 (h) 0·00007.

2. Write the following numbers in full :-

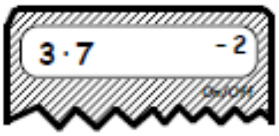
(a) $5{\cdot}1 \times 10^{-2}$ (b) $3{\cdot}6 \times 10^{-4}$ (c) $2{\cdot}74 \times 10^{-3}$ (d) $5{\cdot}06 \times 10^{-5}$

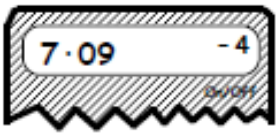
(e) $3{\cdot}2741 \times 10^{-1}$ (f) 4×10^{-3} (g) 7×10^{-5} (h) $8{\cdot}009 \times 10^{-6}$.

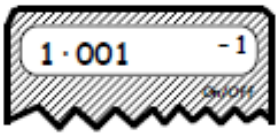
3. A box of toffees weighs $5{\cdot}81 \times 10^{-2}$ kilograms.

Is this more or less than 58 grams ?

4. What small numbers are shown on the calculators below ?

(a) 

(b) 

(c) 

5. Write out in full :-

(a) $4{\cdot}2 \times 10^{-2}$ (b) $7{\cdot}8 \times 10^{6}$ (b) $8{\cdot}01 \times 10^{-4}$ (d) $9{\cdot}021 \times 10^{3}$.

6. Write in scientific notation :-

(a) 0·003 (b) 5470 (c) 0·00039 (d) 21500000.

Significant Figures

Exercise 2 Significant Figures & Rounding 

1. Round each of the following to **one** significant figure :-

a	654	**b**	9126	**c**	7551	**d**	2741
e	14·1	**f**	26·033	**g**	0·0612	**h**	0·96.

2. Round each of the following to **two** significant figures :-

a	5412	**b**	34754	**c**	54370	**d**	90052
e	2·7641	**f**	0·07654	**g**	19·517	**h**	99·99.

Fractions

Exercise 1

FRACTION BUTTON
should NOT be used.

1. Change each of these top heavy fractions to mixed numbers :-

(a) $\frac{15}{2}$ (b) $\frac{16}{3}$ (c) $\frac{42}{5}$ (d) $\frac{91}{20}$

(e) $\frac{25}{4}$ (f) $\frac{63}{8}$ (g) $\frac{122}{11}$ (h) $\frac{629}{25}$

2. Change each of the following to a mixed number and simplify where possible :-

(a) $\frac{30}{4}$ (b) $\frac{25}{10}$ (c) $\frac{131}{5}$ (d) $\frac{100}{15}$

(e) $\frac{305}{25}$ (f) $\frac{78}{8}$ (g) $\frac{1005}{25}$ (h) $\frac{100005}{100}$

3. Change each of the following mixed numbers to a top heavy fraction :-

(a) $3\frac{1}{2}$ (b) $4\frac{1}{3}$ (c) $7\frac{3}{5}$ (d) $10\frac{5}{6}$

(e) $7\frac{8}{9}$ (f) $5\frac{11}{12}$ (g) $10\frac{1}{50}$ (h) $15\frac{8}{15}$

4. How many $\frac{1}{4}$ litre glasses of juice can I get from :-

(a) 2 litres (b) 10 litres (c) $\frac{1}{2}$ litre (d) $3\frac{3}{4}$ litres ?

Exercise 2

1. Copy each of the following and simplify (where possible) :-

(a) $\frac{1}{5}+\frac{3}{5}$ (b) $\frac{2}{7}+\frac{1}{7}$ (c) $\frac{5}{8}-\frac{2}{8}$ (d) $\frac{8}{11}-\frac{5}{11}$

(e) $\frac{4}{5}-\frac{3}{5}$ (f) $\frac{7}{8}-\frac{5}{8}$ (g) $\frac{1}{8}+\frac{3}{8}$ (h) $\frac{4}{10}+\frac{6}{10}$

2. Copy each and simplify :-

(a) $4\frac{1}{2}+2\frac{1}{2}$ (b) $6\frac{1}{4}+1\frac{1}{4}$ (c) $4\frac{3}{4}+2\frac{3}{4}$ (d) $5\frac{7}{8}+\frac{5}{8}$

(e) $2\frac{3}{4}-2\frac{1}{4}$ (f) $7\frac{5}{8}-4\frac{3}{8}$ (g) $10\frac{7}{10}-5\frac{3}{10}$ (h) $2\frac{13}{15}-1\frac{8}{15}$

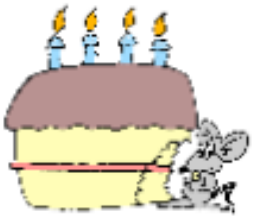
3. Tom walked for $\frac{3}{8}$ of a kilometre, rested, and then walked another $\frac{1}{8}$ kilometres.
How far had Tom walked in total ?

Fractions

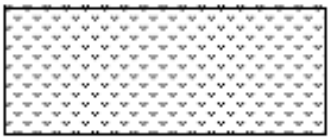
5. 

Bill jogged $5\frac{3}{4}$ km of an eight kilometre run.
How far has Bill still to jog ?

6. At a birthday party, Ann drank $1\frac{1}{4}$ litres of punch,
Alec drank $2\frac{1}{4}$ litres and Jim drank $\frac{3}{4}$ of a litre.

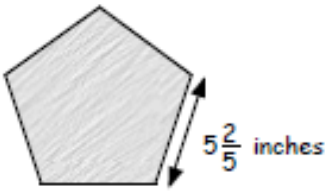


(a) How much punch did they drink altogether.
(b) How much punch was left from a 6 litre bowl ?

7. 

A rectangular garden measures $7\frac{3}{5}$ metres by $4\frac{4}{5}$ metres.
Find the perimeter of the garden.

8. An regular pentagonal garden slab has side $5\frac{2}{5}$ inches.
Find the perimeter of the slab.



Exercise 3

1. **Copy** and complete each of the following calculations and simplify where possible :-
(Remember – denominators must be the same to add or subtract)

(a) $\frac{1}{2} + \frac{1}{8}$ (b) $\frac{2}{3} + \frac{1}{6}$ (c) $\frac{3}{4} - \frac{5}{12}$ (d) $\frac{5}{16} - \frac{1}{4}$

(e) $\frac{7}{10} + \frac{3}{5}$ (f) $\frac{5}{6} - \frac{7}{12}$ (g) $\frac{9}{16} + \frac{3}{4}$ (h) $\frac{9}{51} - \frac{3}{17}$

(i) $\frac{2}{3} + \frac{1}{2} + \frac{1}{4}$ (j) $\frac{5}{12} + \frac{1}{4} - \frac{1}{2}$ (k) $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5}$

2. **Copy** and simplify :-

(a) $3\frac{1}{2} + 1\frac{1}{3}$ (b) $1\frac{1}{3} + 3\frac{1}{4}$ (c) $4\frac{1}{2} + 1\frac{2}{5}$ (d) $4\frac{1}{2} - 1\frac{2}{5}$

(e) $6\frac{7}{8} - 4\frac{3}{4}$ (f) $1\frac{3}{5} - \frac{7}{15}$ (g) $4\frac{9}{10} - 3\frac{3}{4}$ (h) $4\frac{9}{10} + 3\frac{3}{4}$

3. **Copy** and simplify :-

(a) $5 - 2\frac{2}{3}$ (b) $8 - 4\frac{4}{7}$ (c) $4\frac{1}{2} - 2\frac{3}{4}$ (d) $7\frac{3}{8} - 1\frac{1}{2}$

(e) $3\frac{1}{6} - 1\frac{4}{5}$ (f) $11\frac{1}{3} - 9\frac{1}{2}$ (g) $8\frac{2}{5} - 1\frac{2}{3}$ (h) $1\frac{1}{4} - \frac{2}{5}$

Fractions

Exercise 4

1. Copy and complete each calculation (simplifying where possible) :-

(a) $\frac{2}{3} \times \frac{5}{7}$ (b) $\frac{1}{2} \times \frac{3}{5}$ (c) $\frac{3}{4} \times \frac{7}{8}$ (d) $\frac{5}{8} \times \frac{2}{3}$

(e) $\frac{7}{8} \times \frac{1}{14}$ (f) $\frac{2}{3} \times \frac{15}{16}$ (g) $\frac{7}{10} \times \frac{5}{14}$ (h) $\frac{5}{4} \times \frac{8}{15}$

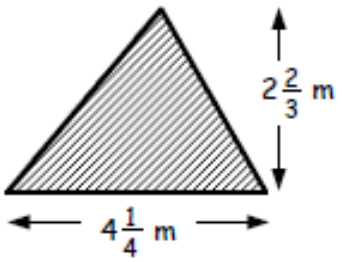
2. Simplify :-

(a) $2\frac{1}{4} \times 3\frac{1}{2}$ (b) $4\frac{2}{3} \times 3\frac{1}{2}$ (c) $2\frac{3}{4} \times 3\frac{1}{2}$ (d) $1\frac{2}{5} \times 2\frac{3}{5}$

(e) $5\frac{4}{5} \times 1\frac{2}{3}$ (f) $1\frac{1}{7} \times 2\frac{4}{5}$ (g) $1\frac{4}{9} \times 4\frac{1}{2}$ (h) $5\frac{3}{5} \times \frac{6}{7}$

3. A large rectangular metal sheet has dimensions $2\frac{2}{5}$ metres by $3\frac{3}{4}$ metres.
Calculate the area of the metal sheet.

4. A triangle has dimensions as shown.
Calculate the area of the triangle.



Exercise 5

1. Copy and complete each calculation (simplifying where possible) :-

(a) $\frac{3}{5} \div \frac{3}{4}$ (b) $\frac{4}{5} \div \frac{2}{15}$ (c) $\frac{1}{8} \div \frac{1}{4}$ (d) $\frac{4}{9} \div \frac{4}{15}$

(e) $\frac{7}{11} \div \frac{7}{22}$ (f) $\frac{8}{15} \div \frac{2}{3}$ (g) $\frac{11}{36} \div \frac{22}{24}$ (h) $\frac{10}{33} \div \frac{25}{36}$

2. Copy and complete :-

(a) $6\frac{2}{3} \div 2\frac{1}{2}$ (b) $4\frac{1}{5} \div 3\frac{1}{2}$ (c) $1\frac{5}{7} \div 1\frac{1}{5}$ (d) $1\frac{2}{3} \div 2\frac{2}{9}$

(e) $4\frac{4}{5} \div 1\frac{1}{15}$ (f) $1\frac{1}{2} \div 1\frac{3}{7}$ (g) $5\frac{2}{5} \div 6\frac{2}{5}$ (h) $2\frac{5}{8} \div 1\frac{2}{5}$

3. A sack of potatoes weighs $12\frac{5}{8}$ kg.
The sack has to be emptied into bags each weighing $2\frac{1}{4}$ kg.
(a) How many full bags can be filled from the sack ?
(b) What weight of potatoes is left ?

4. A twenty metre length of rope is cut into $1\frac{5}{8}$ metre pieces.
How much of the rope would be left over ?

Fractions

Exercise 4

1. Copy and complete each calculation (simplifying where possible) :-

(a) $\frac{2}{3} \times \frac{5}{7}$ (b) $\frac{1}{2} \times \frac{3}{5}$ (c) $\frac{3}{4} \times \frac{7}{8}$ (d) $\frac{5}{8} \times \frac{2}{3}$

(e) $\frac{7}{8} \times \frac{1}{14}$ (f) $\frac{2}{3} \times \frac{15}{16}$ (g) $\frac{7}{10} \times \frac{5}{14}$ (h) $\frac{5}{4} \times \frac{8}{15}$

2. Simplify :-

(a) $2\frac{1}{4} \times 3\frac{1}{2}$ (b) $4\frac{2}{3} \times 3\frac{1}{2}$ (c) $2\frac{3}{4} \times 3\frac{1}{2}$ (d) $1\frac{2}{5} \times 2\frac{3}{5}$

(e) $5\frac{4}{5} \times 1\frac{2}{3}$ (f) $1\frac{1}{7} \times 2\frac{4}{5}$ (g) $1\frac{4}{9} \times 4\frac{1}{2}$ (h) $5\frac{3}{5} \times \frac{6}{7}$

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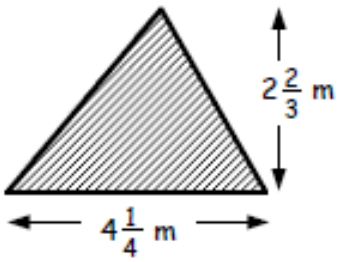


Exercise 5

1. Copy and complete each calculation (simplifying where possible) :-

(a) $\frac{3}{5} \div \frac{3}{4}$ (b) $\frac{4}{5} \div \frac{2}{15}$ (c) $\frac{1}{8} \div \frac{1}{4}$ (d) $\frac{4}{9} \div \frac{4}{15}$

(e) $\frac{7}{11} \div \frac{7}{22}$ (f) $\frac{8}{15} \div \frac{2}{3}$ (g) $\frac{11}{36} \div \frac{22}{24}$ (h) $\frac{10}{33} \div \frac{25}{36}$

2. Copy and complete :-

(a) $6\frac{2}{3} \div 2\frac{1}{2}$ (b) $4\frac{1}{5} \div 3\frac{1}{2}$ (c) $1\frac{5}{7} \div 1\frac{1}{5}$ (d) $1\frac{2}{3} \div 2\frac{2}{9}$

(e) $4\frac{4}{5} \div 1\frac{1}{15}$ (f) $1\frac{1}{2} \div 1\frac{3}{7}$ (g) $5\frac{2}{5} \div 6\frac{2}{5}$ (h) $2\frac{5}{8} \div 1\frac{2}{5}$

3. A sack of potatoes weighs $12\frac{5}{8}$ kg.
The sack has to be emptied into bags each weighing $2\frac{1}{4}$ kg.
(a) How many full bags can be filled from the sack ?
(b) What weight of potatoes is left ?

4. A twenty metre length of rope is cut into $1\frac{5}{8}$ metre pieces.
How much of the rope would be left over ?

Fractions

1. Change to a mixed number :- (a) $\frac{22}{7}$ (b) $\frac{83}{3}$

2. Change to a top heavy fraction :- (a) $4\frac{1}{4}$ (b) $10\frac{2}{9}$

3. Copy and complete :-

   (a) $\frac{2}{5} + \frac{1}{5}$ (b) $\frac{4}{5} + \frac{2}{3}$ (c) $\frac{8}{9} - \frac{2}{3}$ (d) $\frac{4}{5} - \frac{3}{8}$

   (e) $2\frac{4}{5} + 3\frac{3}{4}$ (f) $1\frac{1}{7} + \frac{3}{5}$ (g) $5\frac{2}{3} - 3\frac{3}{5}$ (h) $5\frac{1}{3} - 2\frac{3}{4}$

4. Copy and complete :-

   (a) $\frac{4}{9} \times \frac{7}{8}$ (b) $\frac{2}{3} \times \frac{9}{16}$ (c) $2\frac{1}{3} \times 1\frac{1}{5}$ (d) $5\frac{5}{6} \times 1\frac{3}{7}$

   (e) $\frac{5}{6} \div \frac{2}{3}$ (f) $\frac{7}{9} \div \frac{2}{3}$ (g) $\frac{15}{7} \div \frac{5}{14}$ (h) $3\frac{5}{9} \div 2\frac{2}{3}$

5. A rectangle has length $4\frac{2}{3}$ metres and breadth $2\frac{1}{4}$ metres.
   Calculate the area of the rectangle.

6. A rectangle has an area of $8\frac{3}{4}$ metres.
   If the rectangle has length $5\frac{5}{6}$ metres, find the breadth.

Percentages

1. Write the following percentages as FRACTIONS (simplify where possible) :-

   (a) 50% (b) 25% (c) 75% (d) $33\frac{1}{3}\%$ (e) $66\frac{2}{3}\%$

   (f) 10% (g) 20% (h) 70% (i) 80% (j) 90%.

2. Find the following (remember - no calculator) :-

   (a) 10% of £34 (b) 70% of £20 (c) 20% of £6·50

   (d) 80% of 20p (e) 25% of £4200 (f) $33\frac{1}{3}\%$ of £18

   (g) 5% of £7·20 (h) 1% of £9 (i) 2·5% of £6.

3. Write each of the following as a fraction **AND** as a decimal :-

   (a) 36% (b) 45% (c) 8% (d) 11% (e) 12·5%.

4. Write these percentages as fractions and simplify :-

   (a) 15% (b) 30% (c) 4% (d) 96% (e) 22%.

5. Change these marks to percentages :-

   (a) Geography 32 out of 40.

   (b) Art 9 out of 50.

   (c) Physics 60 out of 80.

   (d) Mental Maths 1 out of 10.

Q 5, 6 & 7

6. Find :-

   (a) 7% of £52 (b) 6% of £520 (c) $17\frac{1}{2}\%$ of £12.

7. The price of colour printers has fallen again this week by 12·5%.

   What is the up to date price of the printer shown.

Last week
£104·00
Now

Percentages

Exercise 2

1. Fares on the Subway Trains are expected to rise soon by 8%.

   What will be the new cost of a ticket which just now is priced £1·25 ?

2. In a sale, a polo shirt, normally priced at £25·50, is reduced by 30%.

   What is the sale price of the shirt ?

3. (a) Increase £70 by 3%. (b) Decrease £620 by 4·5%.

   (c) Increase £1220 by 17·5%. (d) Decrease £80 000 by 7·25%.

4. A petrol lawn mower bought for £180 in 2001 has depreciated in value over the past few years.
   It is now worth 84% less than its original value.

   What is the mower worth today ?

5. 

   A unique painting was purchased in 2002 for £30 000.
   Since then its value has risen by 20% each year.

   If this trend continues, what is the first year in which the painting will be worth at least double its original value ?

6. Mildred borrows £2500 from a Finance Company.

   They add on interest of 12% in the first month, 20% in 2nd month and 25% in the third month.

   Including the amount she borrowed, how much will Mildred owe after 3 months ?

Exercise 3

1. Express £20 as a percentage of :-

   (a) £80 (b) £50 (c) £1000 (d) £4000.

2. Express :-

   (a) £39 as a percentage of £78 (b) £40 as a percentage of £120

   (c) £2·60 as a percentage of £40 (d) 90p as a percentage of £7·20.

3. From a monthly wage of £1450, I pay £94·25 in council tax.

   What percentage of my wage goes on council tax ?

Decimals

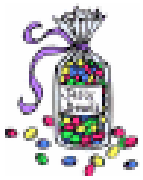
1. Write down the answers to :-

(a)	6 × 0·3	(b)	8 × 0·9	(c)	15 × 0·4	(d)	0·6 × 250
(e)	60 × 0·5	(f)	0·9 × 90	(g)	0·9 × 600	(h)	7000 × 0·3.

2. A tin of mixed fruit drops weighs 6·2 ounces.

What would the following weigh :-

(a)	1000 tins	(b)	40 tins
(c)	700 tins	(d)	3000 tins ?

3.  

A bag of jell-beans costs £0·46.

What is the cost of :-

(a)	8 bags	(b)	70 bags
(c)	400 bags	(d)	5000 bags ?

4. Find :-

(a)	6 × (–0·8)	(b)	8 × (–0·8)	(c)	0·6 × (–3)	(d)	0·7 × (–8)
(e)	15 × (–0·4)	(f)	(–25) × (–0·9)	(g)	(–0·5) × (–120)	(h)	(–0·7) × (–90).

Exercise 4

1. Calculate :-

(a)	4·6 ÷ 2	(b)	7·5 ÷ 5	(c)	4·8 ÷ 8	(d)	7·2 ÷ 9
(e)	18 ÷ 30	(f)	42 ÷ 60	(g)	64 ÷ 80	(h)	45 ÷ 90
(i)	540 ÷ 600	(j)	350 ÷ 500	(k)	630 ÷ 900	(l)	490 ÷ 700
(m)	1·1 ÷ 1000	(n)	4·8 ÷ 3000	(o)	9·5 ÷ 5000	(p)	6·3 ÷ 7000.

2. When 600 carpet tacks are weighed, their total weight is 138 grams.

What is the weight of 1 carpet tack ?

3. A hare ran 1·36 kilometres in 8 minutes.

How far had it travelled, on average, each minute ?

4. Find :-

(a)	(–7·4) ÷ 2	(b)	6·5 ÷ (–5)	(c)	7·2 ÷ (–8)	(d)	(–6·3) ÷ 9
(e)	28 ÷ (–40)	(f)	72 ÷ (–90)	(g)	(–54) ÷ 60	(h)	(–2·8) ÷ (–700).

Decimals

Exercise 5

1. Calculate :-

   (a) $0{\cdot}8 \times 6$ (b) $0{\cdot}8 \times 60$ (c) $0{\cdot}8 \times 600$ (d) $0{\cdot}8 \times 6000$

   (e) $0{\cdot}8 \times 0{\cdot}6$ (f) $0{\cdot}08 \times 0{\cdot}6$ (g) $0{\cdot}008 \times 0{\cdot}6$ (h) $0{\cdot}0008 \times 0{\cdot}6$

   (i) $(0{\cdot}7)^2$ (j) $0{\cdot}09 \times 0{\cdot}3$ (k) $0{\cdot}03 \times 0{\cdot}3$ (l) $0{\cdot}006 \times 0{\cdot}7$

   (m) $0{\cdot}08 \times 30\,000$ (n) $400 \times 0{\cdot}0005$ (o) $0{\cdot}3 \times 0{\cdot}4 \times 0{\cdot}5$ (p) $20 \times 0{\cdot}8 \times 0{\cdot}6$

   (q) $60 \times 0{\cdot}1 \times 700$ (r) $0{\cdot}8 \times 50 \times 0{\cdot}8$ (s) $0{\cdot}7 \times 500 \times 0{\cdot}3$ (t) $0{\cdot}6 \times 5000 \times 0{\cdot}4$.

2. Claire buys 400 bubble gums at £0·07 each. What does this cost her ?

3. One evening last winter, 3 centimetres of snow fell every hour.
   What depth of snow fell during the 15 minutes it was snowing ?

4. Try these trickier examples :-

   (a) $0{\cdot}03 \times 0{\cdot}03$ (b) $0{\cdot}06 \times 0{\cdot}07$ (c) $0{\cdot}08 \times 0{\cdot}09$ (d) $0{\cdot}05 \times 0{\cdot}04$

   (e) $(-0{\cdot}8) \times 0{\cdot}7$ (f) $0{\cdot}02 \times (-0{\cdot}04)$ (g) $(-0{\cdot}08) \times (-0{\cdot}01)$ (h) $0{\cdot}009 \times 0{\cdot}003$.

Exercise 6

1. Find :-

   (a) $6 \div 0{\cdot}3$ (b) $36 \div 0{\cdot}9$ (c) $100 \div 0{\cdot}4$ (d) $2{\cdot}4 \div 0{\cdot}8$

   (e) $4{\cdot}55 \div 0{\cdot}5$ (f) $22{\cdot}33 \div 0{\cdot}7$ (g) $6 \div 0{\cdot}03$ (h) $5{\cdot}2 \div 0{\cdot}04$

   (i) $0{\cdot}54 \div 0{\cdot}006$ (j) $0{\cdot}045 \div 0{\cdot}009$ (k) $0{\cdot}0174 \div 0{\cdot}003$ (l) $12 \div 20$

   (m) $45 \div 500$ (n) $56 \div 7000$ (o) $720 \div 8000$ (p) $350 \div 5000$.

2. 3000 floppy disks can store 4710 megabytes.
   How many megabytes can be stored on one such disk ?

3. A small tub holds 0·08 litres of pineapple yogurt.
   How many tubs can be filled from a container which contains :-

   (a) 3·2 litres (b) 16 litres (c) 40 litres (d) 0·64 litres ?

4. A box of 3000 Xmas cards weighs 4·2 kg, not including the weight of the box itself.
   Work out the weight of one card, (a) in kg's. (b) in grams.

5. Have a go at these :-

   (a) $20 \div 0{\cdot}0004$ (b) $(-0{\cdot}54) \div 0{\cdot}3$ (c) $(-0{\cdot}72) \div (-0{\cdot}8)$ (d) $(-0{\cdot}007) \div (-0{\cdot}07)$.

Decimals

Exercise 7

1. Round these numbers to the number of decimal places shown in the brackets :-

   (a) 5·13 (1) (b) 7·851 (1) (c) 8·736 (2) (d) 6·3492 (2)

   (e) 4·8912 (3) (f) 3·2915 (3) (g) 47·999 24 (3) (h) 3·999 88 (3).

2. Use your calculator to do the following and give your answer correct to 2 decimal places :-

   (a) 4·36 + 6·447 (b) 23·82 × 16·35 (c) 37·1 ÷ 68·3 (d) 16 ÷ 7.

3. Do these calculations and round your answer to the number of decimal places shown in the brackets :-

   (a) 2·58 × 0·247 (3) (b) 0·394 × 6·555 (2) (c) 6·274 × 1·983 (3)

   (d) 0·58 ÷ 3·267 (3) (e) 16·27 ÷ 19·443 (1) (f) 0·7 × 0·19 × 0·87 (4).

4. (a) Nine people share £14. How much does each receive ?

   (b) Share £27·98 amongst 3 people.
   What is the maximum amount each person can receive ?

Exercise 8

1. How many **significant figures** does each number have in the following context :-

   (a) There are 700 pennies in £7.

   (b) The cost of a soft toy is exactly £7·50.

   (c) There are 180° in a half-turn.

   (d) The volume of a small bottle of juice is 200 ml, correct to the nearest 100 ml.

2. How many significant figures are there in each of these numbers :-

   (a) 62·0 (b) 3·00 (c) 1·009 (d) 40·7

   (e) 26·30 (f) 0·741 (g) 0·027 (h) 0·000 90 ?

3. Round each number to 1 significant figure :-

   (a) 53 (b) 2679 (c) 0·251 (d) 0·000 815.

4. Round each number to 2 significant figures :-

   (a) 308 (b) 5229 (c) 48·55 (d) 0·003 281.

5. Round each number to 3 significant figures :-

   (a) 9812 (b) 72 091 (c) 0·287 45 (d) 0·019 999.