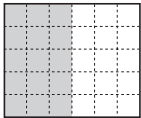
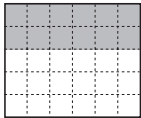
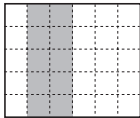
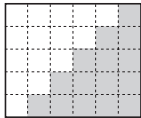
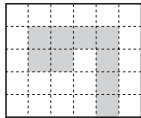
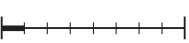
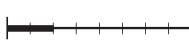



1

Write in the boxes the part of the unit which has been shaded.

a) i)  ii)  iii)  iv)  v) 

b) i)  ii)  iii) 

2

Answer with fractions in your exercise book.

- a) What part of a metre is: 10 cm, 50 cm, 7 cm, 120 cm?
 b) What part of an hour is: 1 min, 6 min, 30 min, 60 min, 120 min?
 c) What part of a day is: 6 hours, 8 hours, 12 hours, 24 hours, 30 hours?

3

a) How many cm are these parts of a 36 cm line segment?

i) $\frac{1}{3}$ ii) $\frac{1}{6}$ iii) $\frac{5}{6}$ iv) $\frac{13}{12}$ v) $\frac{5}{9}$

b) How long are these parts of a 4 m length of ribbon?

i) $\frac{1}{8}$ ii) $\frac{1}{4}$ iii) $\frac{3}{4}$ iv) $\frac{3}{2}$ v) $\frac{5}{8}$ vi) $\frac{8}{5}$

c) How many apples are in these parts of a box of 48 apples?

i) $\frac{1}{2}$ ii) $\frac{5}{16}$ iii) $\frac{5}{4}$ iv) $\frac{23}{24}$ v) $\frac{7}{48}$ vi) $\frac{2}{3}$

4

a) Draw a 3×3 square in your exercise book.

Colour $\frac{2}{3}$ of its area in *yellow*, then colour $\frac{2}{3}$ of the *yellow* part in *red*.

What part of the whole area is the *red* part?

b) Draw a 6×5 rectangle in your exercise book.

Colour $\frac{4}{5}$ of its area in *green*, then shade $\frac{2}{3}$ of the *green* part in *blue*.

What part of the whole area is the *blue* part?

5

a) Convert these fractions to 24ths and write them in increasing order in your exercise book.

$\frac{1}{2}$, $\frac{3}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{4}$, $\frac{4}{3}$, $\frac{7}{24}$, $\frac{16}{8}$, $\frac{5}{6}$, $1\frac{5}{12}$

b) Convert each fraction to an equivalent fraction with numerator 12. Write them in increasing order in your exercise book.

$\frac{3}{4}$, $\frac{2}{11}$, $\frac{6}{5}$, $\frac{1}{3}$, $\frac{6}{7}$, $\frac{5}{10}$, $\frac{9}{6}$, $\frac{4}{5}$, $\frac{4}{3}$, $\frac{3}{2}$

1

- a) Step along the number line by $\frac{1}{3}$ from -2 . Label the numbers that you land on.



- b) Step along the number line by $\frac{3}{5}$ from -2 . Label the numbers that you land on.

**2**

- a) Multiply the numerator of $\frac{1}{8}$ by 2, 3, 4, 5 and 6 and write the fractions in your exercise book. Write a sentence about how the value of the fraction changes.
- b) Multiply the numerator of $\frac{1}{5}$ by 2, 3, 4, 5 and 6 and write the fractions in your exercise book. Write a sentence about how the value of the fraction changes.

3

- a) $\frac{1}{8} \times 7 =$ b) $\frac{1}{5} \times 8 =$ c) $\frac{1}{5} \times 13 =$ d) $\frac{3}{8} \times 2 =$
 e) $\frac{4}{5} \times 3 =$ f) $\frac{5}{6} \times 7 =$ g) $\frac{7}{10} \times 4 =$ h) $\frac{3}{20} \times 3 =$
 i) $4\frac{2}{5} \times 3 =$ j) $5\frac{1}{2} \times 2 =$ k) $3\frac{3}{4} \times 7 =$

4

- a) Divide the numerator of $\frac{6}{8}$ by 2, 3 and 6 in your exercise book. Write a sentence about how the value of the fraction changes.
- b) Divide the numerator of $\frac{12}{25}$ by 2, 3, 6 and 12 in your exercise book. Write a sentence about how the value of the fraction changes.

5

- a) $\frac{6}{7} \div 2 =$ b) $\frac{9}{10} \div 3 =$ c) $\frac{8}{9} \div 4 =$
 d) $\frac{21}{8} \div 7 =$ e) $\frac{32}{35} \div 8 =$ f) $\frac{18}{7} \div 9 =$

6

- a) Multiply the denominator of $\frac{1}{2}$ by 2, 3, 4, 5 and 6 in your exercise book. Write a sentence about how the value of the fraction changes.
- b) $\frac{1}{2} \div 2 =$ $\frac{1}{2} \div 3 =$ $\frac{1}{2} \div 4 =$ $\frac{1}{2} \div 5 =$ $\frac{1}{2} \div 6 =$
 c) $\frac{3}{4} \div 2 =$ $\frac{2}{3} \div 3 =$ $\frac{4}{7} \div 3 =$ $\frac{4}{5} \div 5 =$ $\frac{1}{6} \div 4 =$

1

- a) i) $\frac{1}{6} \times 5 =$ ii) $\frac{1}{6} \times 3 =$ iii) $\frac{1}{6} \times 11 =$ iv) $\frac{5}{6} \times 2 =$
- b) i) $\left(3 + \frac{2}{5}\right) \times 4 =$ ii) $3\frac{2}{5} \times 4 =$ iii) $12\frac{3}{4} \times 5 =$
- c) i) $\frac{6}{8} \div 2 =$ ii) $\frac{6}{8} \div 3 =$ iii) $\frac{14}{15} \div 7 =$ iv) $\frac{24}{5} \div 4 =$
- d) i) $\frac{1}{3} \div 2 =$ ii) $\frac{3}{5} \div 2 =$ iii) $\frac{4}{9} \div 5 =$ iv) $\frac{25}{4} \div 3 =$

2

- a) Divide the denominator of $\frac{1}{6}$ by 2 and by 3 in your exercise book.
Draw a diagram to show each division. Write a sentence about how the value of the fraction changed as its denominator decreased.
- b) Divide the denominator of: i) $\frac{1}{4}$ by 2 ii) $\frac{1}{9}$ by 3 iii) $\frac{1}{10}$ by 5
Draw diagrams to show each division.

3

- a) $\frac{2}{5} \times 5 =$ $\frac{1}{6} \times 3 =$ $\frac{3}{4} \times 2 =$ $\frac{9}{10} \times 5 =$ $\frac{7}{12} \times 6 =$
- b) i) $1\frac{1}{2} \times 2 =$ ii) $3\frac{5}{8} \times 4 =$ iii) $2\frac{2}{3} \times 2 =$
- c) Write a sentence about how the value of a fraction changes if its denominator is:
i) multiplied 2, 3, 4, ... ii) divided by 2, 3, 4, ...

4

- a) Multiply the numerator and the denominator of $\frac{2}{3}$ by 2, 3 and 5.
How did the value of the fraction change? Draw diagrams to show it.
- b) Divide the numerator and the denominator of $\frac{12}{30}$ by 2, 3 and 6.
How did the value of the fraction change? Draw diagrams to show it.

5

Fill in the missing digits.

- a) $\frac{3}{4} = \frac{\square}{8} = \frac{12}{\square} = \frac{15}{\square} = \frac{\square}{28} = \frac{48}{\square} = \frac{30}{\square} = \frac{\square}{100} = \frac{750}{\square} = 0.\square\square$
- b) $\frac{4}{7} = \frac{8}{\square} = \frac{\square}{70} = \frac{16}{\square} = \frac{\square}{56} = \frac{20}{\square} = \frac{\square}{49} = \frac{\square}{210}$
- c) $\frac{3}{10} = 0.\square = \frac{\square}{100} = \frac{300}{\square} = \frac{\square}{10\,000} = 0.\square\square = 0.\square\square\square$
- d) $2\frac{4}{5} = 2\frac{\square}{10} = 2.\square = \square\frac{12}{15} = \square\frac{24}{30} = 2\frac{28}{\square}$

1

a) Circle the numbers which are less than 1. Tick the numbers which equal 1. 

$$\frac{3}{4} \quad \frac{32}{5} \quad \frac{12}{37} \quad \frac{92}{59} \quad \frac{7}{7} \quad \frac{9}{2} \quad \frac{116}{120} \quad \frac{16}{16} \quad \frac{9}{8}$$

b) Convert the numbers greater than 1 to mixed numbers in your exercise book.

2

Fill in the missing digits.

a) $\frac{2}{5} = \frac{\square}{10} = \frac{20}{\square} = \frac{6}{\square} = \frac{\square}{20} = \frac{\square}{35} = \frac{18}{\square} = \frac{\square}{100} = \frac{\square}{75} = \frac{\square}{1000}$

b) $\frac{14}{10} = \frac{7}{\square} = \square.\square = \frac{\square}{30} = \square \frac{2}{\square} = 1 \frac{\square}{100} = \frac{\square}{50} = \frac{70}{\square} = \square \frac{40}{\square}$

c) $2.03 = 2.\square\square\square = 2.\square\square\square = \frac{\square}{100} = \square \frac{\square}{100} = \frac{2030}{\square}$

d) $\frac{60}{72} = \frac{\square}{36} = \frac{\square}{24} = \frac{\square}{18} = \frac{\square}{12} = \frac{\square}{9} = \frac{\square}{6}$

3

Calculate the sums and differences in your exercise book.

a) i) $\frac{1}{8} + \frac{5}{8}$ ii) $\frac{2}{10} + \frac{7}{10} + \frac{3}{10}$ iii) $\frac{6}{7} - \frac{2}{7}$ iv) $\frac{4}{5} + \frac{7}{5} - \frac{9}{5}$

b) i) $1\frac{4}{5} + 2\frac{1}{5} + 8\frac{3}{5}$ ii) $3 - \frac{7}{12}$ iii) $2\frac{4}{9} + \frac{2}{9} - 1\frac{5}{9}$ iv) $5\frac{3}{8} - 3\frac{5}{8}$

c) i) $\frac{1}{2} + \frac{1}{4}$ ii) $\frac{5}{6} + \frac{4}{3}$ iii) $\frac{11}{12} + \frac{2}{3} - \frac{3}{4}$ iv) $1\frac{3}{10} + \frac{4}{5} - \frac{3}{2}$

4

Convert the fractions to a common denominator, then do the calculation.

a) i) $\frac{13}{5} + \frac{3}{2}$ ii) $\frac{1}{2} - \frac{4}{5}$ iii) $1\frac{2}{3} + \frac{7}{8}$ iv) $\frac{1}{7} - \frac{1}{8}$ v) $3\frac{7}{9} - 2\frac{1}{2}$

b) i) $\frac{3}{4} + \frac{5}{6}$ ii) $\frac{7}{10} - \frac{1}{4}$ iii) $2\frac{1}{6} + 1\frac{3}{8}$ iv) $4\frac{5}{20} - 1\frac{5}{12}$

5

Write a plan, do the calculation and write the answer in your exercise book.

- a) Yesterday I bought 3 quarters of a kg of potatoes and today I bought half a kg of potatoes. How many kg of potatoes did I buy altogether?
- b) A family took 3 quarters of a kg of grapes on a picnic. How many kg of grapes did they bring home if they ate 3 fifths of a kg during the picnic?
- c) Two friends decide to walk to the beach, which is 2 and 3 quarter kilometres from their camp site. They walk 1 and 5 sixths kilometres, then have a rest. How far do they still have to go?

1

List at least 3 numbers which could be written instead of the square.

a) $\frac{4}{5} < \square < 1$ \square :

b) $2 < \square < 2\frac{1}{3}$ \square :

c) $1\frac{3}{4} < \square < 2\frac{1}{4}$ \square :

2Practise multiplication and division. **Simplify** the fractions where necessary.

a) $\frac{1}{9} \times 9 =$ b) $\frac{1}{6} \times 1 =$ c) $\frac{1}{11} \times 5 =$ d) $\frac{4}{7} \times 7 =$

e) $\frac{3}{4} \times 2 =$ f) $\frac{7}{8} \times 4 =$ g) $\frac{5}{12} \times 3 =$ h) $\frac{7}{20} \times 10 =$

i) $3\frac{1}{4} \times 3 =$ j) $6\frac{1}{3} \times 6 =$ k) $8\frac{1}{2} \times 9 =$ l) $\frac{13}{10} \times 3 =$

m) $\frac{3}{8} \div 3 =$ n) $\frac{2}{13} \div 2 =$ o) $\frac{13}{20} \div 4 =$ p) $\frac{3}{5} \div 6 =$

q) $\frac{21}{20} \div 7 =$ r) $\frac{21}{20} \div 4 =$ s) $\frac{17}{33} \div 11 =$ t) $\frac{28}{35} \div 7 =$

3

a) Write each of these decimals in hundredths and in thousandths.

i) 9.3 ii) 4.75 iii) 0.3 iv) 0.05 v) 1.0

b) Write each of these numbers as a decimal.

i) $\frac{136}{10}$ ii) $5\frac{31}{100}$ iii) $10\frac{1}{100}$ iv) $\frac{583}{1000}$ v) $\frac{27}{1000}$

4

Fill in the missing digits.

a) $\frac{4}{5} = \frac{\square}{10} = \frac{12}{\square} = \frac{20}{\square} = \frac{\square}{60} = \frac{60}{\square} = \frac{88}{\square} = \frac{\square}{1000} = \frac{80}{\square} = \square$

b) $\frac{7}{4} = \frac{14}{\square} = \frac{\square}{20} = \frac{49}{\square} = \frac{\square}{84} = \frac{210}{\square} = \frac{\square}{100} = \frac{\square}{1000} = \square$

c) $8.16 = 8.\square\square\square = 8.\square\square\square\square = \frac{\square}{100} = \square \frac{\square}{100} = \frac{816}{\square}$

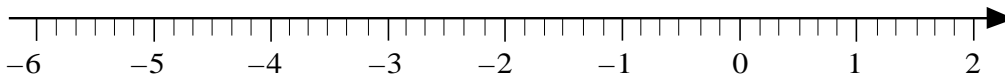
5

I had lots of Christmas cards to write. I wrote 1 third on Monday, 2 eighths on Tuesday, 1 sixth on Wednesday and wrote the remaining 27 cards on Thursday.

How many Christmas cards did I send?

1**Simplify** these fractions and mark them on the number line.

a) $\frac{160}{240} =$ b) $\frac{240}{160} =$ c) $-\frac{72}{12} =$ d) $-\frac{12}{72} =$

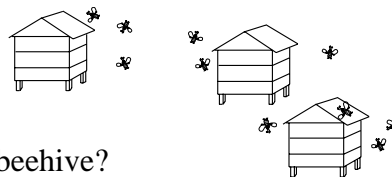
**2**

Write a plan, do the calculation, check the result and write the answer in a sentence.

- a) A farmer had 3 beehives. He collected $2\frac{4}{5}$ kg of honey from one of the beehives and 3.2 kg of honey from another.

If he collected $9\frac{2}{5}$ kg of honey altogether,

how much honey did he collect from the 3rd beehive?



- b) Two cyclists started at the same time from either end of an 80.4 km journey and cycled towards each other. They both had a rest break at the same time.

By then, one cyclist had covered $20\frac{3}{4}$ km and the other had covered 21.5 km.

How far apart were they when they stopped to rest?

- c) Mum bought 1200 g of grapes. Andy ate 1 fifth of them, Betty ate 1 quarter of them and Charlie ate 1 third of them. Dad ate the rest.

What amount of grapes did each of them eat?



- d) Kate gathered 45.6 kg of strawberries in 12 hours. Julie worked for 10 hours but collected $18\frac{4}{5}$ kg less than Kate. What amount of strawberries did Julie gather?

3

Practise addition and subtraction in your exercise book.

a) $\frac{1}{2} - \left(\frac{1}{8} + \frac{1}{4}\right)$ b) $\frac{2}{5} - \left(\frac{1}{10} - \frac{1}{20}\right)$ c) $2\frac{5}{6} - \left(1\frac{1}{2} - \frac{2}{3}\right)$

d) $3.16 - (1.2 + 0.5)$ e) $4.03 - (2.1 - 0.8)$ f) $3.18 - (0.6 - 1.2)$

g) $\frac{3}{2} + \left(-\frac{5}{2}\right)$ h) $\frac{5}{8} - \left(-\frac{1}{4}\right)$ i) $-\frac{4}{9} - \left(-\frac{2}{3}\right)$

4

Write a plan, do the calculation and write the answer in your exercise book.

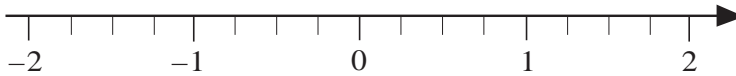
- a) One side of a rectangle is $\frac{3}{4}$ m long and the other side is $\frac{2}{3}$ m long.

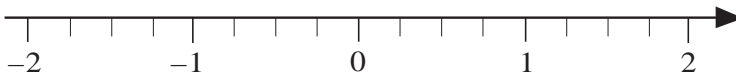
What length is its perimeter?

- b) The side of a square is $4\frac{3}{5}$ cm long. What length is its perimeter?

1

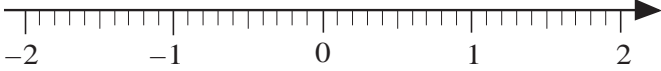
Show the solution to each inequality on the number line.

a) $x < 1\frac{3}{4}$ 

b) $x \leq 1\frac{3}{4}$ 

2

Show the solution to each inequality on the number line.

a) Numbers which are less than + 2 but are **not** less than (- 1.5). 

b) $-1.5 \leq x < 2$, and x is a whole number 

c) $-x < 1.2$ 

3

Practise addition and subtraction in your exercise book.

a) i) $\frac{3}{5} + \frac{4}{5}$ ii) $\frac{7}{15} - \frac{3}{15}$ iii) $\frac{4}{9} + \frac{11}{9} - \frac{20}{9}$ iv) $3\frac{3}{6} + 2\frac{2}{6} - 4\frac{1}{6}$

b) i) $\frac{2}{5} + \frac{4}{15}$ ii) $\frac{5}{28} + \frac{2}{7} - \frac{3}{14}$ iii) $3\frac{5}{8} - \frac{7}{4}$ iv) $4 - 2\frac{5}{9}$

c) i) $13.4 - (10.25 - 5.6)$ ii) $13.4 - 10.25 + 5.6$

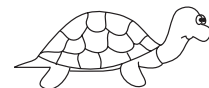
d) i) $-5.6 - (+3.1) + (-4.5) - (-2.7)$ ii) $-5.6 - 3.1 - 4.5 + 2.7$

4

Write a plan, calculate, check and write the answer as a sentence in your exercise book.

a) *Tommy Tortoise* took 1 hour to move $65\frac{3}{4}$ metres. This was $6\frac{5}{6}$ metres more than the distance covered by *Timmy Tortoise* in the same time.

What distance did *Timmy Tortoise* move in an hour?



b) Jenny cut 3 pieces from a 20.8 m length of ribbon. The lengths of the 3 pieces were $5\frac{1}{2}$ m, 7.2 m and $2\frac{2}{5}$ m.

Could Jenny cut another piece 6.5 m long from the ribbon that is left?

c) The sum of two fractions is $\frac{5}{8}$. One fraction is 1 greater than the other fraction.

What are the two fractions?

1

Convert the decimals to fractions. Simplify where possible.

- | | | | | |
|-------|-----------|-----------|-----------|-----------|
| a) i) | $0.27 =$ | ii) | $0.46 =$ | |
| | iii) | $10.35 =$ | iv) | $103.5 =$ |
| b) i) | $0.25 =$ | ii) | $0.50 =$ | |
| | iii) | $0.75 =$ | iv) | $7.25 =$ |
| c) i) | $0.125 =$ | ii) | $0.375 =$ | |
| | iii) | $0.625 =$ | iv) | $0.875 =$ |

2

Convert the fractions to decimals.

- | | | | | | |
|----|-----------------|-----------------|-----------------|------------------|--------------------|
| a) | $\frac{1}{2} =$ | $\frac{2}{2} =$ | $\frac{3}{2} =$ | $5\frac{1}{2} =$ | $-16\frac{1}{2} =$ |
| b) | $\frac{1}{4} =$ | $\frac{2}{4} =$ | $\frac{3}{4} =$ | $\frac{4}{4} =$ | $\frac{135}{4} =$ |
| c) | $\frac{1}{8} =$ | $\frac{3}{8} =$ | $\frac{5}{8} =$ | $\frac{6}{8} =$ | $\frac{7}{8} =$ |
| d) | $\frac{1}{5} =$ | $\frac{2}{5} =$ | $\frac{3}{5} =$ | $\frac{4}{5} =$ | $\frac{9}{5} =$ |
| e) | $\frac{1}{3} =$ | $\frac{2}{3} =$ | $\frac{3}{3} =$ | $\frac{4}{3} =$ | $2\frac{1}{3} =$ |
| f) | $\frac{1}{6} =$ | $\frac{2}{6} =$ | $\frac{3}{6} =$ | $\frac{4}{6} =$ | $\frac{5}{6} =$ |
| g) | $\frac{1}{9} =$ | $\frac{2}{9} =$ | $\frac{4}{9} =$ | $\frac{5}{9} =$ | $\frac{7}{9} =$ |

3

Do the calculations in your exercise book.

- | | | | |
|----|---|----|---|
| a) | $\frac{63}{84} + \frac{45}{75} - \frac{72}{90}$ | b) | $\frac{45}{35} + \frac{20}{16} - \frac{15}{35} + \frac{20}{28}$ |
|----|---|----|---|

4

Solve the problems and equations in your exercise book.

- a) If I add 1 to a number, the sum is $\frac{27}{48}$. What is the number?
- b) If I subtract 3 from a number, the result is $1\frac{1}{8}$. What is the number?
- | | | | |
|----|---|----|---|
| c) | $\frac{x}{75} + \frac{11}{15} = \frac{18}{25},$ | d) | $\frac{25}{14} - \frac{d}{70} = \frac{21}{10},$ |
| | $x = ?$ | | $d = ?$ |

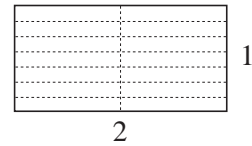
1

In your exercise book, calculate each product in two ways:

- a) i) $\frac{5}{8} \times 4$ ii) $\frac{7}{10} \times 2$ iii) $\left(-\frac{3}{28}\right) \times 7$ iv) $\frac{6}{35} \times (-5)$ v) $\left(-\frac{5}{8}\right) \times (-2)$
- b) i) $\frac{2}{3} \times 3$ ii) $\frac{3}{8} \times 8$ iii) $\frac{5}{13} \times 13$ iv) $-\frac{7}{9} \times 9$ v) $\frac{3}{25} \times (-25)$
- vi) $\left(-\frac{8}{17}\right) \times (-17)$

2

a) Calculate $\frac{3}{7}$ of the area of a 1 unit by 2 unit rectangle.



b) Calculate: i) $\frac{5}{4}$ of 3 ii) $\frac{5}{4}$ times 3

3

Calculate in your exercise book:

- a) i) $\frac{5}{3}$ of 60 ii) $60 \times \frac{5}{3}$ b) i) $\frac{11}{18}$ of 6 ii) $6 \times \frac{11}{18}$
- c) i) $\frac{7}{3}$ of 8 ii) $8 \times \frac{7}{3}$ d) i) $\frac{17}{5}$ of 15 ii) $15 \times \frac{17}{5}$

4

Solve these problems in your exercise book.

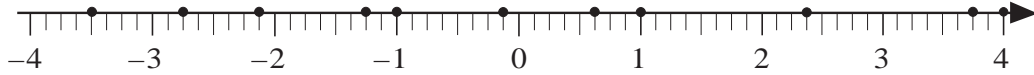
- a) *Henry Hedgehog* ate $\frac{4}{13}$ of his 39 apples. How many apples did he have left?
- b) Paul had £150. He spent $\frac{1}{3}$ of £150, then $\frac{2}{5}$ of £150.
- i) How much did Paul spend?
- ii) How much money did he have left?
- c) Liz had £150. Then she was given some money by her grandparents so she now has $\frac{4}{3}$ of her original amount.
- If she spends $\frac{1}{4}$ of her money, how much will she have left?
- d) How much money do I have if $\frac{5}{3}$ of $\frac{3}{5}$ of it is £480?
- e) One side of a rectangle is 32 cm long and its adjacent side is $\frac{3}{4}$ of its length.
- i) How long is the other side? ii) How long is its perimeter?
- iii) What is the area of the rectangle?



1

A **rational** number is any number which can be written as a fraction, where the numerator and denominator are whole numbers but the denominator is not zero.

a) Label in fraction form the **rational** numbers marked on the number line.



b) Mark the **opposite** value of each number in *red*.

c) Write each of the marked numbers as a decimal. d) What is their sum?

2

Practise addition and subtraction in your exercise book.

a) i) $\frac{4}{9} + \frac{2}{9}$ ii) $\frac{11}{12} - \frac{5}{12}$ iii) $\frac{13}{20} + \frac{3}{10} - \frac{21}{20}$ iv) $8\frac{2}{5} - 7\frac{3}{10} + 2\frac{1}{2}$

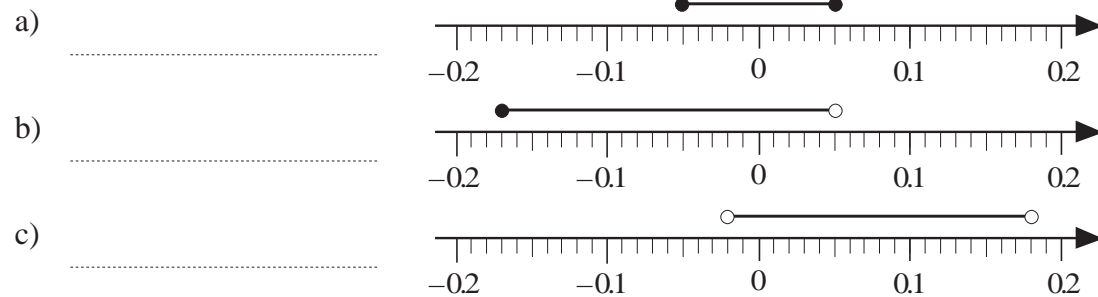
b) i) $\frac{3}{4} + \frac{9}{16}$ ii) $\frac{3}{100} + \frac{1}{4} - \frac{1}{5}$ iii) $11\frac{5}{13} - \frac{29}{26}$ iv) $8 - 3\frac{5}{7}$

c) i) $139 - (20.7 - 5.8)$ ii) $45.33 - 8.03 + 9.1$

d) i) $-4.4 - (+5.5) + (-3.3) - (-2.2)$ ii) $-100 - 54.35 - 17.98 + 20.6$

3

Write an inequality to match the solution shown on each number line.



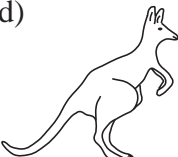
4

Solve the problems in your exercise book.

a) Emma saved £50 per month for a quarter of a year but each month she spent 1 tenth of what she had saved. How much had she saved by the end of the quarter?

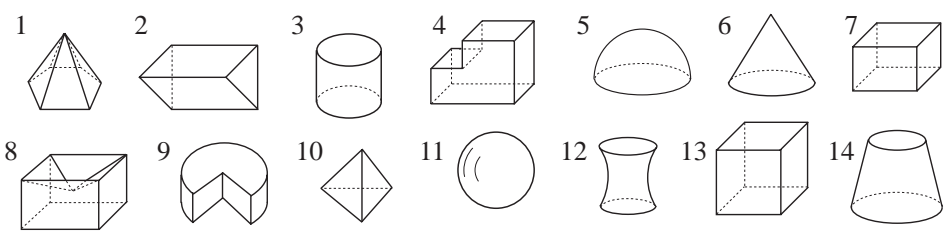
b) How many kg do I weigh if $\frac{3}{8}$ of $\frac{2}{3}$ of my weight is 12 000 g?

c) A 1 litre jug was $\frac{2}{3}$ full of lemonade. Barry drank 7 tenths of the lemonade and Steve drank what was left. How many cl did Steve drink?

d)  *Kangaroo* took 4 jumps to get from one bush to the next in search of better shade from the sun. His first jump was 2.7 m, his second jump was 1 ninth longer than the first, his 3rd jump was one sixth shorter than the 2nd and his 4th jump was 4 fifths of his 3rd jump. How far apart were the two bushes?

1

Which description fits which solids? Write the numbers of the matching solids.



- a) It has only plane faces.
- b) It has at least one plane face.
- c) It has at least 2 plane faces.
- d) It has perpendicular faces.
- e) It has at least one triangular face.
- f) It has only rectangular faces.
- g) It has at least 2 parallel edges.
- h) It has perpendicular edges.

2

Count the faces, edges and vertices of the above solids which have **only** plane faces.
Complete the table.

Solid	1								
Number of faces									
Number of edges									
Number of vertices									

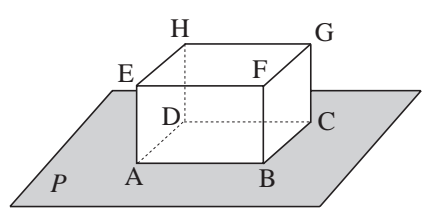
3

Complete the sentences.

- a) When we divide up a surface, the surface pieces are bounded by .
- b) A line can be curved or .
- c) When we divide up a line, the segments start and end with .
- d) A point on a straight line divides the line into **half lines** or **rays**.
- e) The part of a straight line between two different points is called a .
- f) A straight line in a plane divides that plane into half planes.
- g) Two different **parallel** lines divide their plane into parts.
- h) Two **intersecting** lines divide their plane into parts.

4

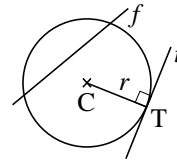
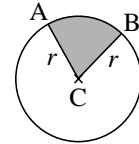
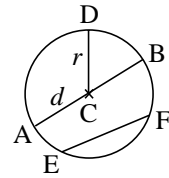
- a) Colour *red* a point on the plane *P*.
- b) Colour *green* a point which is **not** on the plane *P*.
- c) Colour *yellow* an edge which is in the plane *P*.
- d) Colour *blue* an edge which is **not** in the plane *P*.



1

Complete the sentences about **circles**.

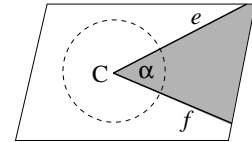
- a) The line segment joining the **centre** of a circle (C) and a point (D) on its **circumference** is called the .
- b) A section between two **points** on the circumference is called an .
- c) A **chord** which lies on the centre of the circle is called the .
- d) Two points on the circumference divide it into **arcs**.
- e) Two **radii** of a circle divide the circle into **sectors**.
- f) A chord divides the circle into segments.
- g) Line *f* is an and line *t* is a of the circle.



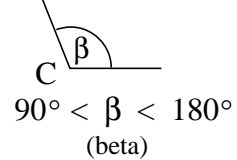
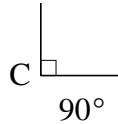
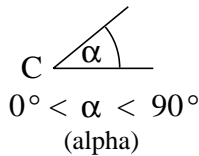
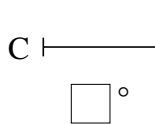
2

Fill in the missing items about **angles**.

- a) The two half lines (*e* and *f*) form two .
- b) C is the and *e* and *f* are the of the angle α .



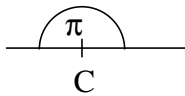
- c) **null angle** angle angle angle



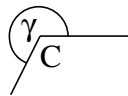
angle

reflex angle

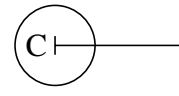
whole angle



$\pi = 180^\circ$
(pi)



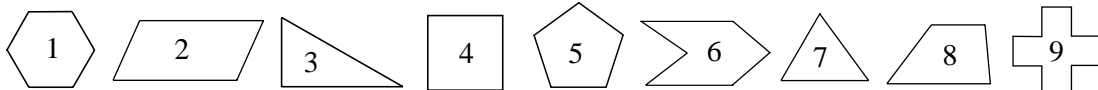
$180^\circ < \gamma < \square^\circ$
(gamma)



$^\circ$

3

Which description fits which polygons? Write the numbers of the matching polygons.



- a) It has only **acute** angles.
- b) It has no angle greater than 90°
- c) It has more than 3 **diagonals**.
- d) It can be divided into more than 2 parts by **one** straight cut.

1

In your exercise book, draw: i) a triangle ii) a quadrilateral iii) a pentagon.

Complete the sentences.

- a) A **polygon** is enclosed only by .
- b) A polygon has the same number of as it has .
- c) Each **vertex** of a polygon is shared by only **sides**.
- d) The broken line enclosing a polygon is closed and does not itself.

2

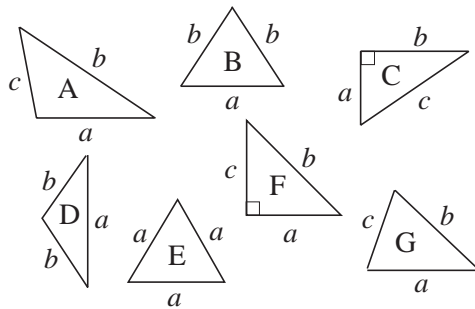
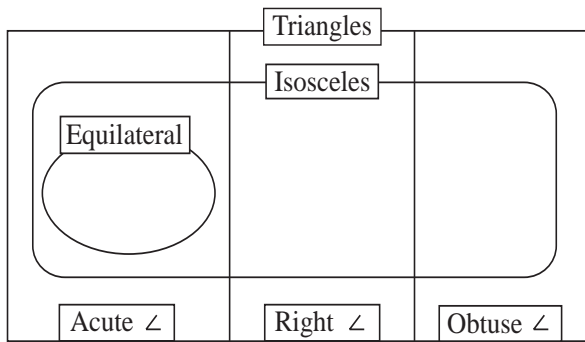
In your exercise book, draw three separate **acute** angles.

Cut the 2 arms of each angle with a straight line so that these triangles are formed:

- a) acute-angled triangle
- b) obtuse-angled triangle
- c) right-angled triangle.

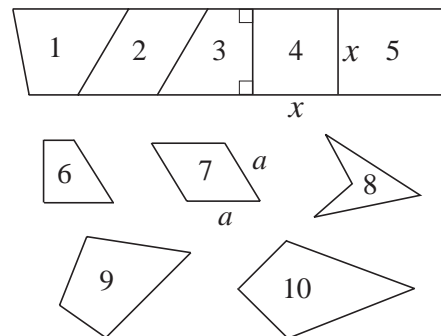
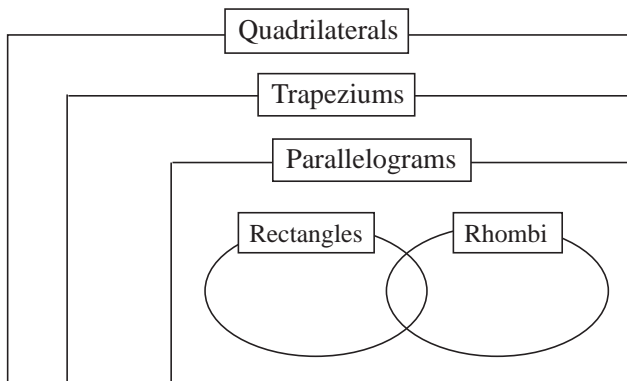
3

Write the letters of these triangles in the correct part of the set diagram.



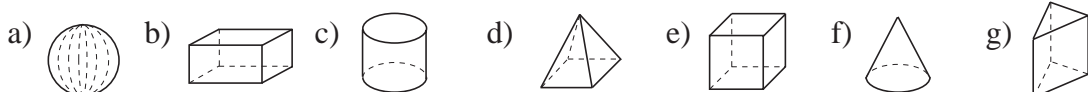
4

Write the numbers of these quadrilaterals in the correct part of the set diagram.



5

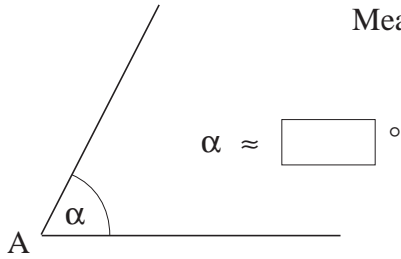
Write the names of the solids below each diagram.



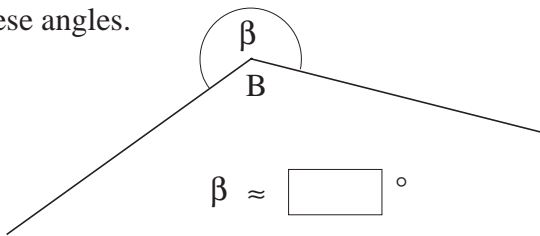
.....

1

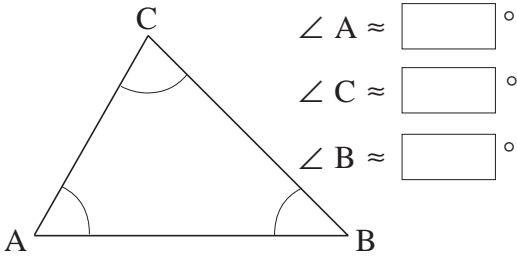
Measure these angles.



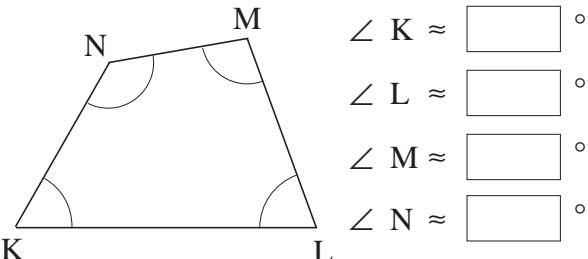
$\alpha \approx \square^\circ$



$\beta \approx \square^\circ$



$\angle A \approx \square^\circ$
 $\angle C \approx \square^\circ$
 $\angle B \approx \square^\circ$



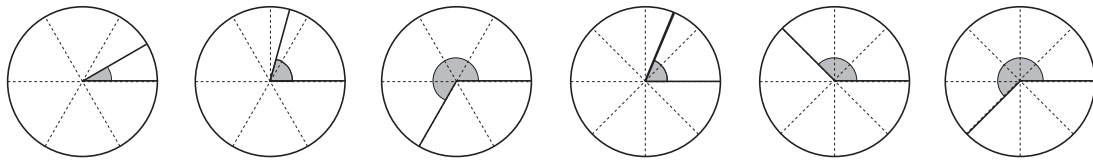
$\angle K \approx \square^\circ$
 $\angle L \approx \square^\circ$
 $\angle M \approx \square^\circ$
 $\angle N \approx \square^\circ$

2

Draw these angles in your exercise book. a) 40° b) 116° c) 270°

3

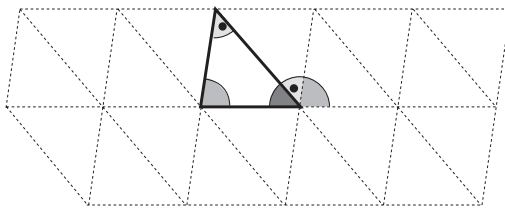
How many degrees are these angles?



.....

4

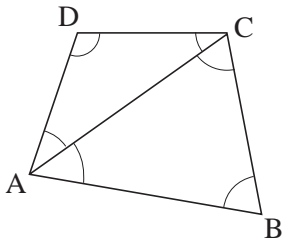
a) What is the sum of the angles in this triangle? The shading might help you.



$\sphericalangle + \sphericalangle + \sphericalangle = \square^\circ$

Is the sum the same for any other triangle in the grid?

b)



Fill in the missing items.

- i) The sum of the angles in $\triangle ABC$ is $^\circ$
- ii) The sum of the angles in $\triangle ACD$ is $^\circ$
- iii) The sum of the angles in ABCD is $^\circ$

5

Remember that $1^\circ = 60'$ (angle minutes) and $1' = 60''$ (angle seconds).

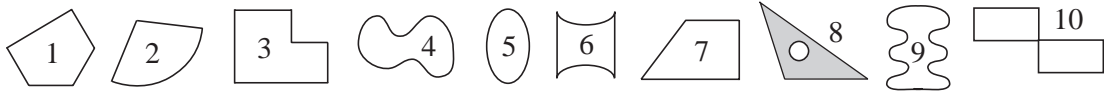
a) Calculate the 3rd angle of a triangle which has angles of $48^\circ 30'$ and $62^\circ 25'$.

3rd angle: $^\circ$

b) What kind of triangle is it?

1

Study these plane shapes. What do some of them have in common?



What do the shapes listed below have in common? Write a sentence about each set.

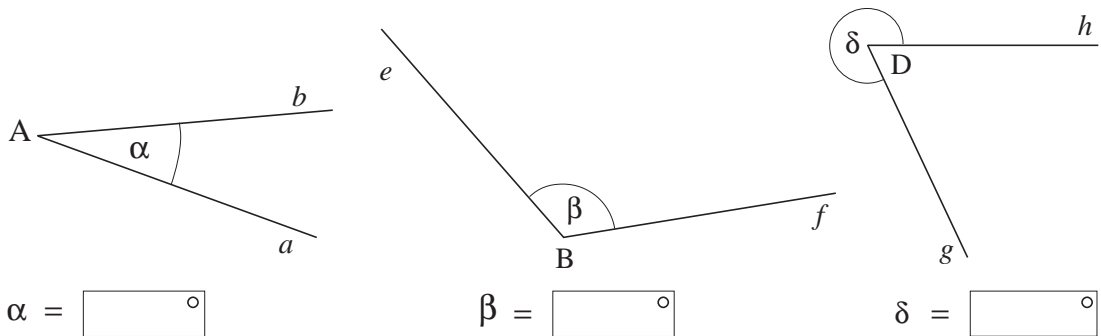
- a) 1, 3, 7
- b) 4, 5, 9
- c) 2, 4, 5, 6, 8, 9.....
- d) 1, 3, 6, 7, 10.....
- e) 1, 3, 7, 10
- f) 3, 4, 6, 8, 9, 10.....
- g) 1, 2, 5, 6, 9.....
- h) Make up a set which is different from those given. Write a sentence about it.

2

- a) Draw a **circle** with radius 2.2 cm. Draw its diameter. Draw any chord AB.
 - i) What length is the diameter of the circle? ii) What length is AB?
- b) Draw a **square** with side length 38 mm. Draw diagonal BD.
 - i) What length is BD? ii) What is the perimeter and area of the square?
- c) Draw a 5.6 cm by 4.9 cm **rectangle**. Draw diagonal AC.
 - i) What length is AC? ii) What is the perimeter and area of the rectangle?
- d) Draw a **triangle** ABC, with $AB = 4.5$ cm, $\angle A = 30^\circ$ and $\angle B = 54^\circ$.
 - i) What length is its perimeter? ii) What size is $\angle C$?
 - iii) What is its perpendicular height from AB to C?

3

a) Measure each angle. Write its size in the box and its type on the dotted line.



b) On plain paper, draw angles of: i) 32° ii) 78° iii) 145° iv) 290° .

1

Fill in the missing items.

- a) **Length** $1 \text{ mm} < 1 \text{ cm} < \boxed{} < 1 \text{ km}$
 $\times 10$ $\times 100$ $\times \boxed{}$
- b) $\boxed{} \quad 1 \text{ mm}^2 < \boxed{} < 1 \text{ m}^2 < 1 \text{ hectare} < 1 \text{ km}^2$
 $\times 100$ $\times 10\,000$ $\times 10\,000$ $\times \boxed{}$
- c) **Mass** $1 \text{ mg} < 1 \text{ g} < 1 \text{ kg} < \boxed{}$
 $\times 1000$ $\times \boxed{}$ $\times 1000$
- d) $\boxed{} \quad 1 \text{ ml} < \boxed{} < 1 \text{ litre}$
 $\times 10$ $\times \boxed{}$
- e) **Volume** $1 \text{ mm}^3 < \boxed{} < 1 \text{ m}^3 < \boxed{}$
 $\times 1000$ $\times 1 \text{ million}$ $\times 1 \text{ billion}$
- f) $\boxed{} \quad 1'' < 1' < 1^\circ$
 $\times 60$ $\times 60$ $\times \boxed{}$
- g) **Time** $1 \text{ sec} < 1 \text{ min} < 1 \text{ hour} < \boxed{} < 1 \text{ week} < \boxed{}$
 $\times \boxed{}$ $\times \boxed{}$ $\times 24$ $\times 7$ $\times \boxed{}$

2

Write the missing numbers.

- a) $34.6 \text{ m} = \underline{\hspace{2cm}} \text{ cm} = \underline{\hspace{2cm}} \text{ mm} = \underline{\hspace{2cm}} \text{ km}$
- b) $0.6 \text{ tonnes} = \underline{\hspace{2cm}} \text{ kg} = \underline{\hspace{2cm}} \text{ g}$
- c) $4567 \text{ g} = \underline{\hspace{2cm}} \text{ kg} = \underline{\hspace{2cm}} \text{ tonnes}$
- d) $6282 \text{ ml} = \underline{\hspace{2cm}} \text{ cl} = \underline{\hspace{2cm}} \text{ litres}$
- e) $3.2 \text{ hours} = \underline{\hspace{2cm}} \text{ min} = \underline{\hspace{2cm}} \text{ sec}$
- f) $1.5 \text{ m}^2 = \underline{\hspace{2cm}} \text{ cm}^2 = \underline{\hspace{2cm}} \text{ mm}^2$

3

What is:

- a) $\frac{3}{4}$ of 1 kg b) 0.7 of 230 m c) $1\frac{2}{5}$ of 120 litres d) $\frac{3}{4}$ of $\frac{3}{4}$ km?

4

Calculate the times and angles.

- a) $2 \text{ h } 15 \text{ min } 5 \text{ sec}$ b) $25^\circ 42' 36''$ c) $32^\circ 30' \times 2$ d) $4 \text{ h } 59 \text{ min} \div 2$
 $+ 1 \text{ h } 49 \text{ min } 45 \text{ sec}$ $- 7^\circ 15' 27''$
 _____ _____
 _____ _____

1

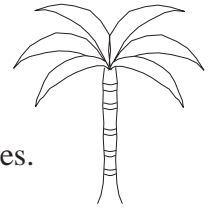
Precise measurements are important in design, technology, engineering, chemistry, medicine, etc. In everyday life, it is enough to use rough estimates and conversions.

Complete the missing items. Write as fractions and as decimals.

- a) If 1 inch \approx 2.5 cm, then 1 cm \approx in \approx inches
- b) If 1 foot \approx 0.3 m, then 1 m \approx ft \approx feet
- c) If 1 metre \approx 1.1 yards, then 1 yard \approx m \approx metres
- d) If 1 mile \approx 1.6 km, then 1 km \approx miles \approx miles
- e) If 1 ounce \approx 28 g, then 1 g \approx oz \approx ounce
- f) If 1 kg \approx 2.2 lb, then 1 lb \approx kg \approx kilograms
- g) If 1 pint \approx 0.57 litres, then 1 litre \approx pt \approx pints
- h) If 1 gallon \approx 4.5 litres, then 1 litre \approx gal \approx gallons

2

- a) On a map of the *Balearic Islands*, **Palma** on the island of **Majorca** is situated at latitude 2.7° East and longitude 39.5° North. Find Palma on your map.



- b) The area of Majorca is 3640.16 km^2 . Convert its area to square miles. [1 square mile \approx 2.6 km^2]
- c) The length of Majorca's coast is 554.7 km. Convert it to miles. [1 km \approx $\frac{5}{8}$ mile]
- d) The annual average temperature in Majorca is 15.8°C . Convert it to degrees Fahrenheit using this formula:
- $$x^\circ\text{C} = \left(\frac{9x}{5} + 32\right)^\circ\text{F}$$
- e) The shortest shipping route between Majorca and Menorca is 34 Miles long and is about 63 km. Is this nautical Mile the same as the usual road mile?
- f) On the plane to Majorca, the captain informed us that our plane was flying at a height of 30 000 feet. What is the height in metres and kilometres?
- g) The captain told us that our plane was flying at a speed of 900 km per hour. Calculate the speed in miles per hour (mph).

3

Solve the problems in your exercise book.

- a) The road sign shows that it is $15\frac{1}{2}$ miles to Stanstead Airport. If our coach is travelling at a speed of 96 km per hour, how long will it be before we get there?
- b) What is 2 thirds of 360 lb in kg?
- c) A capacity of 1 litre is practically equivalent to 1000 cm^3 , and 1 kg of water is close to 1 litre. How many kg is 600 cm^3 of water?

1

Which quantity is more?

- a) $\frac{3}{4}$ of 500 kg or $\frac{3}{8}$ of 1 tonne b) 0.4 of £1250 or $\frac{4}{5}$ of £1250
- c) $\frac{5}{2}$ of 5700 m² or 2 times 4900 cm²

2

The value of one currency against another is always changing. For example,

on **12.10.2000**: 1 GBP \approx 1.46 USD [GBP means Great Britain's Pound (£)
 1 GBP \approx 1.69 EUR USD means United States Dollar (\$)
 so 1 EUR \approx 0.87 USD EUR means Euro (€)]

on **12.08.2003**: 1 GBP \approx 1.60 USD
 1 GBP \approx 1.42 EUR
 so 1 EUR \approx 1.13 USD



- a) What changes do you notice in the value of:
- i) the £ against the \$ ii) the £ against the € iii) the € against the \$?
- b) How many *Dollars* and how many *Euros* were the equivalent of £1500 on each of these two dates?

The change in value of the *Hungarian Forint* (HUF)  during the same time is very interesting.

On **12.10.2000**: 1 GBP \approx 443 HUF On **12.08.2003**: 1 GBP \approx 367 HUF
 1 USD \approx 303 HUF 1 USD \approx 228 HUF
 1 EUR \approx 263 HUF 1 EUR \approx 259 HUF

- c) To which of the 3 currencies was the *Hungarian Forint* most closely linked?
- d) How many *Hungarian Forints* were equivalent to £1500, \$1500 and €1500 on each of these two dates?

3The quality of gold and jewels is measured in **carats**.

The carat for gold is different from the carat for diamonds.



The purity of gold is measured in 24ths. For example, a 1-carat gold ring means that one 24th of its mass is pure gold.

- a) How much pure gold is in an 8-carat gold ring which weighs $2\frac{2}{3}$ g?
- b) How much pure gold is in a 14-carat gold necklace which weighs 4.5 g?

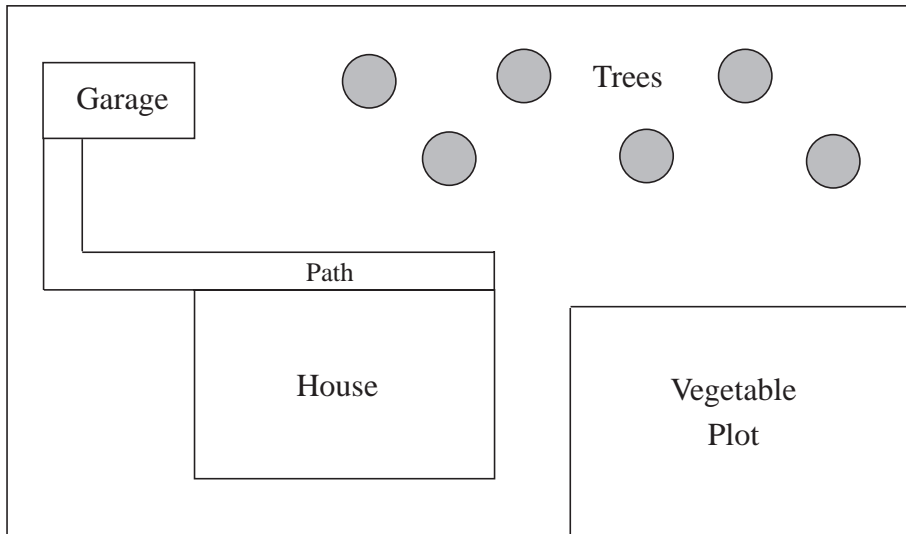
4

- a) What is your mass: i) in grams ii) in tonnes? (Answer to the nearest kg.)
- b) The weight of any object on the moon would be 1 sixth lighter than it is here on Earth. What would the mass of a 1 kg loaf of bread be on the Moon?
- c) A plane took off at 8.45 am in Budapest and landed at 12.35 pm in New York. If New York time is 6 hours earlier than Budapest time, how long was the flight?

1

This is the plan of a house and its garden.

Scale: 1 : 400



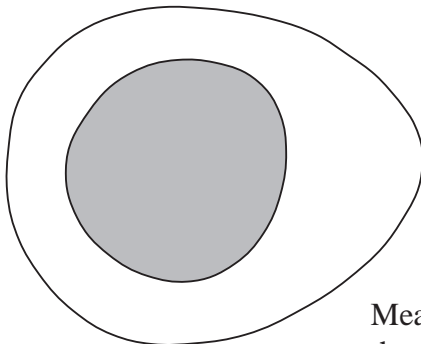
- a) Measure on the plan, then calculate the real lengths and widths of:
 i) the house ii) the garage iii) the vegetable plot iv) the whole garden.
- b) Calculate: i) the perimeter of the vegetable plot ii) the area of the garden.

2

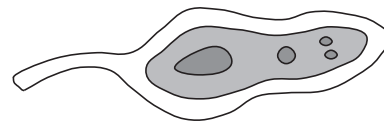
These are diagrams of a living cell and a longitudinal section of a bacterium.

a) Living cell

b) Longitudinal section of a bacterium



Scale: 1 : 1



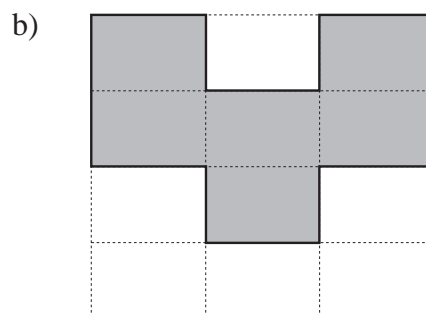
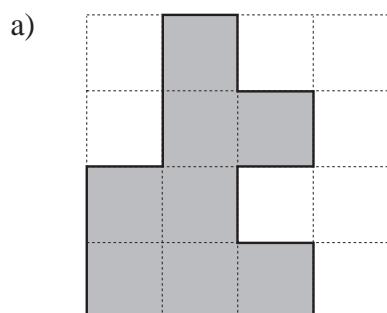
Scale: 500 : 1

Measure the lengths and widths on the diagrams, then calculate their sizes in real life.

What do you think the diagram in a) could be?

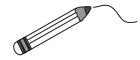
3

Measure the sides of each shape, then calculate its perimeter and area.



1

Join up the equal amounts.



3 h 24 min 34045 g $\frac{3}{24}$ day 340.45 cm
 3.4 hours 3420 ml $\frac{171}{500}$ litre 34.2 cl $34\frac{1}{5}$ cl
 £340.45 34 $\frac{9}{200}$ tonnes 34045 p 342 ml 34 045 kg

2

Calculate the times.

a) $\begin{array}{r} 6 \text{ h } 53 \text{ min } 10 \text{ sec} \\ + 8 \text{ h } 19 \text{ min } 55 \text{ sec} \\ \hline \end{array}$ b) $\begin{array}{r} 12 \text{ h } 24 \text{ min } 5 \text{ sec} \\ - 4 \text{ h } 23 \text{ min } 17 \text{ sec} \\ \hline \end{array}$ c) $\begin{array}{r} 16 \text{ h } 37 \text{ min } 29 \text{ sec} \\ - 14 \text{ h } 51 \text{ min } 6 \text{ sec} \\ \hline \end{array}$

3

a) Fill in the missing numbers.

The Earth takes 24 hours to turn by 360° around its axis. So the Earth turns $^\circ$ each hour and takes minutes to turn 1° .



b) Because the Earth is turning, the light from the sun hits different parts of it at different times, so all the countries on Earth are in different **time zones**.

The table shows the time difference (in hours) for various cities around the world compared with the time in the UK, which is **Greenwich Meridien Time (GMT)**.

	GMT						
<i>San Francisco</i>	<i>New York</i>	<i>Rio de Janeiro</i>	<i>London</i>	<i>Budapest</i>	<i>Moscow</i>	<i>Beijing</i>	<i>Sydney</i>
- 8 h	- 5 h	- 3 h	0 h	+ 1 h	+ 3 h	+ 8 h	+ 10 h

i) When it is 8.00 am GMT, what time is it in:

New York Sydney Beijing

Budapest Moscow London?

ii) When it is 13:30 in Budapest, what time is it in:

London Beijing

San Francisco Rio de Janeiro?

4

a) A plane left London at 11.00 am on Saturday for an 11 hour flight to San Francisco. What was the time in San Francisco when it landed?

b) A plane left London for Moscow at 10.00 pm on Sunday. It was 4.00 am on Monday in Moscow when it landed. How long was the flight?

c) A plane landed at 12 noon in London after a 9 and a half hour flight from Beijing. What time was it in Beijing when the plane took off?

