

Quick Check

Foundation Tier

UNIT 1

1. What is (a) 5^2 (b) 7^2 (c) 3^3 (d) 4^3 ?
2. What is (a) 2^6 (b) 3^4 ?
3. Which of these numbers are prime?
10, 11, 12, 13, 14, 15, 16, 17, 18, 19 ?
4. What are all the factors of 24?
5. What are the prime factors of 60?
6. Which of these numbers are square numbers?
20, 25, 32, 49, 64, 88, 100
7. What is the value of
(a) $\sqrt{16}$ (b) $\sqrt{36}$ (c) $\sqrt{81}$ (d) $\sqrt{900}$?

Answers

1. (a) 25 (b) 49 (c) 27 (d) 64
2. (a) 64 (b) 81
3. 11, 13, 17, 19
4. 1, 2, 3, 4, 6, 8, 12, 24
5. 2, 3, 5
6. 25, 49, 64, 100
7. (a) 4 (b) 6 (c) 9 (d) 30

Quick Check

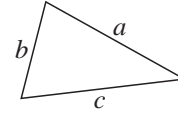
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UNIT 2

1. The perimeter of a triangle is given by $p = a + b + c$.

What is the value of p when

$$a = 4 \text{ cm}, \quad b = 5.3 \text{ cm}, \quad c = 4.9 \text{ cm}?$$



2. The cost of 1 litre of fresh orange juice is x pence. Write down a formula for the total cost, C in pence, of y litres of orange juice.

Use your formula to work out the total cost of 7.5 litres when the price per litre is 38p.

3. The formula $^{\circ}\text{F} = \left(\frac{9}{5} \times ^{\circ}\text{C}\right) + 32$

gives the temperature in degrees Fahrenheit ($^{\circ}\text{F}$) for any temperature in degrees Celsius ($^{\circ}\text{C}$).

Change these temperatures into $^{\circ}\text{F}$.

- (a) 20°C (b) -10°C (c) 0°C ?

4. The total cost, C in £, charged by a removal firm for its van to travel a distance x km is given by

$$C = 2.5x + 65$$

What is the total cost for a journey of distance

- (a) 10 km (b) 100 km?

Answers

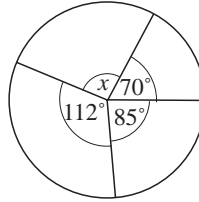
1. 14.2 cm
2. $C = xy$; $C = 285\text{p}$ (or £2.85)
3. (a) 68°F (b) 14°F (c) 32°F
4. (a) £90 (b) £315.

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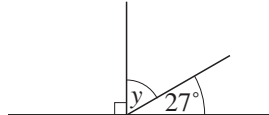
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UNIT 3

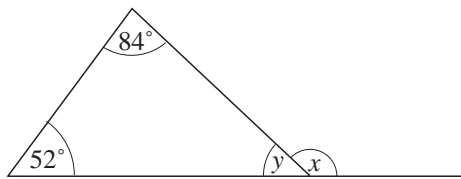
1. What is the value of x ?



2. What is the value of y ?

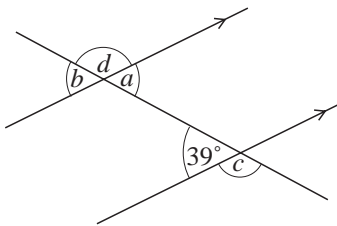


3.



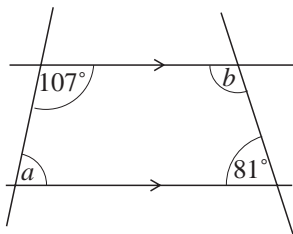
Calculate x and y .

4.



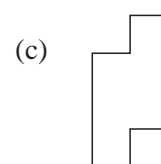
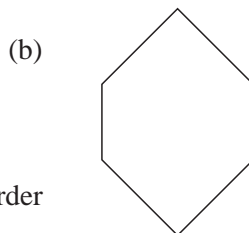
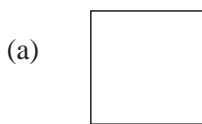
Find a , b , c and d .

5.



Find a and b .

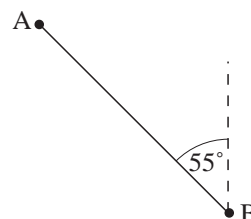
6. Draw all the lines of symmetry on these shapes:



Also, for each shape, state its order of rotational symmetry.

7. What is the bearing of

(a) A from B, (b) B from A?



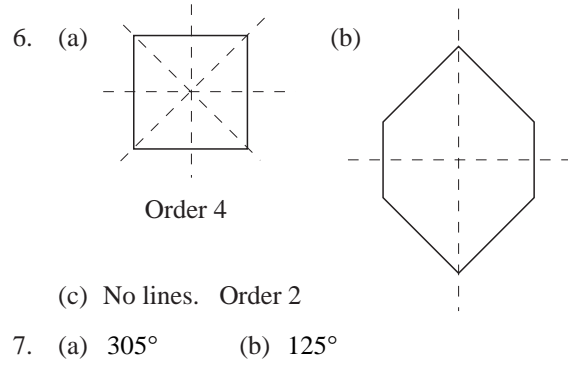
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UNIT 3

Answers

1. 93°
2. 63°
3. $x = 136^\circ$, $y = 44^\circ$
4. $a = 39^\circ$, $b = 39^\circ$, $c = 141^\circ$, $d = 141^\circ$
5. $a = 73^\circ$, $b = 99^\circ$



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UNIT 5

- Which of these events is
(a) *most likely* to occur,
(b) *least likely* to occur?

A : It will rain tomorrow in the UK.
B : A third division team will win the FA Cup next year.
C : A British player will win Wimbledon next year.
D : There will be a baby born tomorrow in the UK.
- The probability of a train arriving either early or on time is 0.8. What is the probability that it will arrive late?
- You have a biased coin. The probability of getting a 'head' is $\frac{2}{3}$. What is the probability of getting a 'tail'?
- With an unbiased dice, what is the probability of:
(a) obtaining a 3,
(b) obtaining a number greater than 3?
- In the last 20 days, a pupil has been late for school three times. What do you estimate is the probability that the pupil will be late tomorrow?
- You toss a coin and throw a dice. List all the possible outcomes. What is the probability of obtaining a 'head' on the coin and a '6' on the dice?

Answers

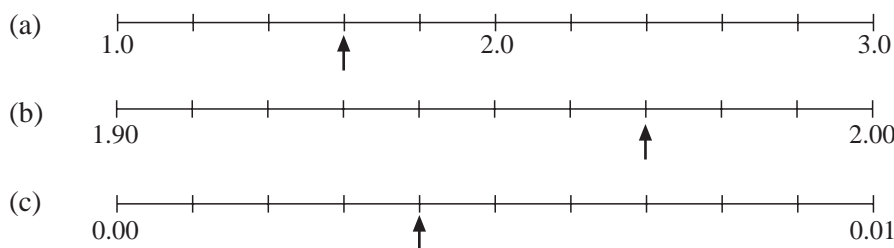
- (a) D (b) B (or C!)
- 0.2
- $\frac{1}{3}$
- (a) $\frac{1}{6}$ (b) $\frac{1}{2}$
- $\frac{3}{20}$
- H1, H2, H3, H4, H5, H6,
T1, T2, T3, T4, T5, T6 ; $\frac{1}{12}$

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UNIT 6

- Write these fractions as decimals: (a) $\frac{3}{10}$ (b) $\frac{27}{100}$ (c) $\frac{7}{100}$
- Write these decimals as fractions: (a) 0.9 (b) 0.23 (c) 0.03
- What values are indicated on these scales?



- You cut lengths of 95 cm, 1.47 m and 72 cm from a plank of length 4 m. What length is left?
- Without using a calculator, write down the value of:
 - 700×0.4
 - 30×0.02
 - $16 \div 0.8$
 - $315 \div 0.15$
- Write these numbers in order of size, starting with the smallest:

$$\frac{3}{4}, 0.702, 0.749, \frac{7}{10}, 0.08$$
- Without using a calculator, work out the exact value of:
 - $1081 \div 23$
 - $962 \div 37$
 - 27×34
 - 19×43
- Estimate the value of each of the following, and check your answers using a calculator.
 - 49×31
 - $413 \div 21$
 - $\frac{58 \times 29}{87}$

Answers

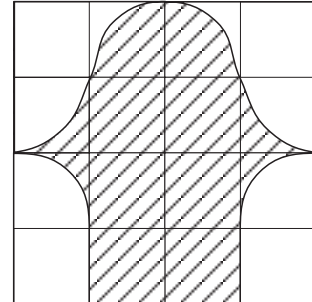
- (a) 0.3 (b) 0.27 (c) 0.07
- (a) $\frac{9}{10}$ (b) $\frac{23}{100}$ (c) $\frac{3}{100}$
- (a) 1.6 (b) 1.97 (c) 0.004
- 86 cm
- (a) 280 (b) 0.6 (c) 20 (d) 2100
- 0.08, $\frac{7}{10}$, 0.702, 0.749, $\frac{3}{4}$
- (a) 47 (b) 26 (c) 918 (d) 817
- (a) 1519 (b) 19.67 (2 d.p.) (c) 19.33 (2 d.p.)

Quick Check

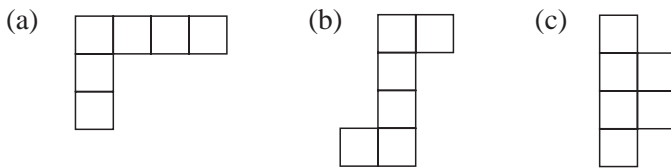
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UNIT 7

1. Each of the squares represents an area of 1 square cm. Estimate the area of the shape shaded.



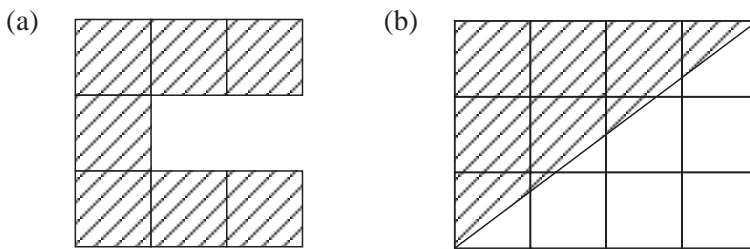
2. Which of these nets can be folded to make a cube?



3. Convert:

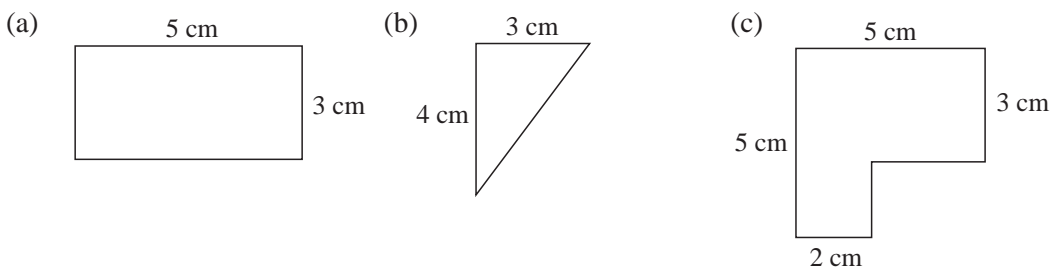
- (a) 9 inches to centimetres,
- (b) 7 pints to litres,
- (c) 2.5 pounds to kg,
- (d) 250 grams to ounces (16 ounces = 1 pound)

4. Calculate the area of each of the shaded shapes: (The squares are each 1 cm².)



(c) What is the perimeter of the shape in (a)?

5. Calculate the area of each of the shapes sketched below:



6. A circle has radius 21 cm. What is its (a) area (b) circumference?

7. The wheel of a bicycle has a diameter of 48 cm. What is the circumference of the wheel? If you cycle 20 km, how many revolutions does the wheel make?

8. What is the volume of a cube of side length 6 cm?

9. What is the volume of a cuboid with side lengths 2 cm, 6 cm and 18 cm?

10. On isometric paper, sketch a cube.

11. Draw a net for a cuboid of side lengths 2 cm, 3 cm and 4 cm.

Quick Check

Foundation Tier

UNIT 7

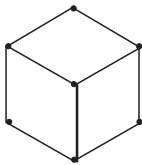
Answers

1. 8 to 9 cm²
2. (b)
3. (a) 22.8 cm (1 d.p.) (b) 4 litres (1 s.f.)
 (c) 1.12 kg (d) 8.96 oz
4. (a) 7 cm² (b) 6 cm² (c) 16 cm
5. 15 cm² (b) 6 cm² (c) 19 cm²
6. (a) 1385.4 cm² (1 d.p.) (b) 131.9 revolutions (1 d.p.)
7. 150.8 cm (1 d.p.) ; 13263 (nearest whole revolution)

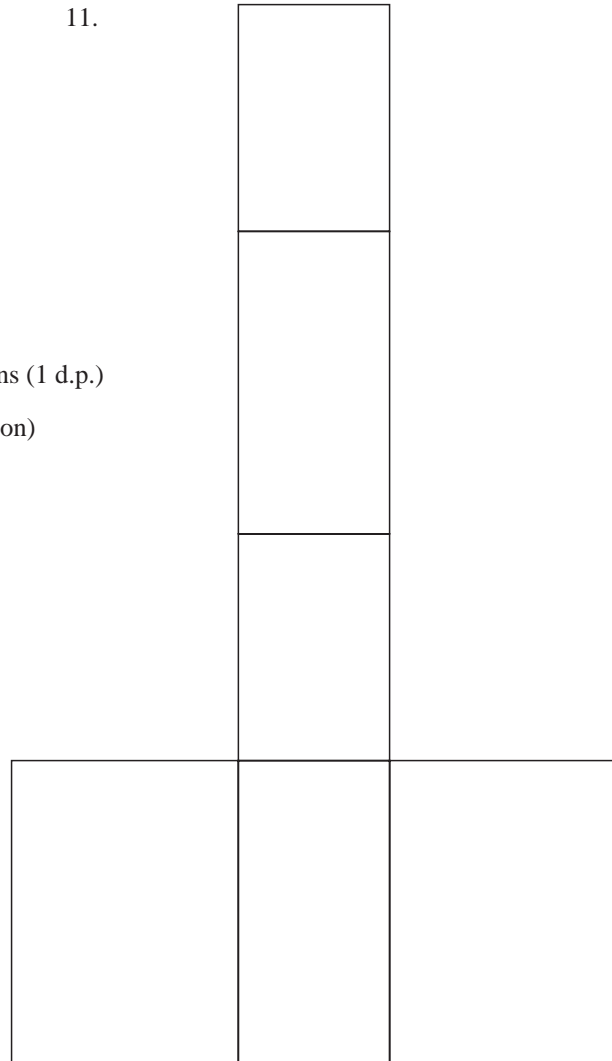
8. 216 cm³

9. 216 cm³

10.



11.



Quick Check

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UNIT 8

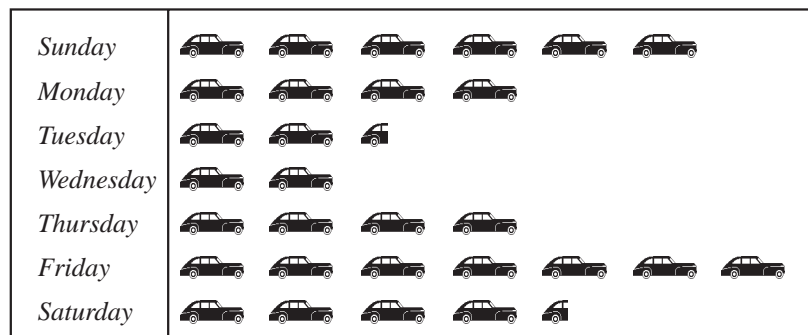
1. The two-way table below shows the number of students achieving GCSE in Science and Maths.

| | | <i>Maths</i> | | | | | |
|----------------|-------|--------------|---|---|---|---|-------|
| | | A* | A | B | C | D | E/F/G |
| <i>Science</i> | A* | 2 | 3 | 2 | 0 | 1 | 0 |
| | A | 1 | 4 | 3 | 2 | 0 | 0 |
| | B | 1 | 4 | 3 | 2 | 0 | 0 |
| | C | 1 | 0 | 4 | 5 | 2 | 1 |
| | D | 0 | 1 | 2 | 3 | 4 | 2 |
| | E/F/G | 0 | 1 | 0 | 2 | 1 | 0 |

- (a) How many students achieved the same grade in both exams?
- (b) How many students who attained grades A and A* in Maths did not obtain A or A* in Science?
- (c) What does the table suggest about the grades achieved in Science and Maths?

2. The pictogram below show the number of cars carried in a week by a ferry.

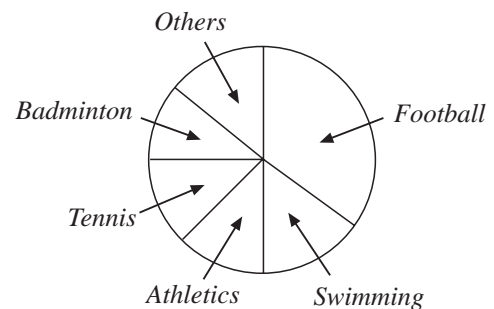
Each  represents 100 cars.



- (a) On which day were most cars carried?
- (b) How many cars were carried on Thursday?
- (c) How many cars were carried on Saturday?
- (d) How many cars were carried in total during the week.
What was the average number carried per day?

3. The pie chart shows the favourite sports of 120 people.

- (a) The angle for *Football* is 120° .
How many people does this represent?
- (b) *Swimming* was chosen by 18 people.
What size angle will represent this on the pie chart?
- (c) If the angles for *Athletics*, *Tennis* and *Badminton* are 45° , 45° and 39° , how many people chose *Others*?

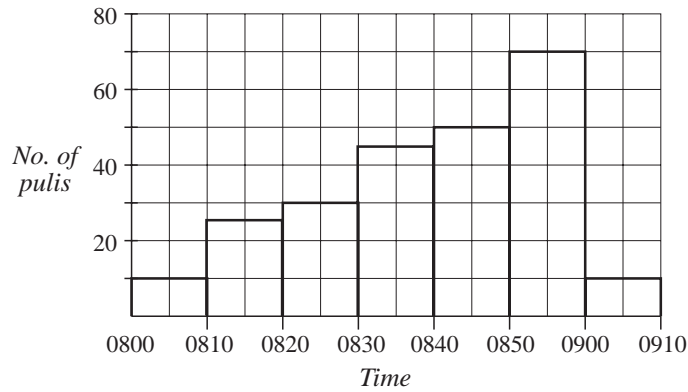


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Foundation Tier

UNIT 8

4. The chart below shows the times at which pupils arrived at school one morning:



- (a) How many pupils arrived between 0830 and 0900?
 (b) How many pupils were there in total?

Answers

1. (a) 18 (b) 8
 (c) positive correlation between grades
 2. (a) Friday (b) 400 (c) 450 (d) 3000 ; 429 (nearest whole number)
 3. (a) 40 (b) 54° (c) 19
 4. (a) 165 (b) 240

Quick Check

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UNIT 9

1. A hockey team scored the following numbers of goals in their first 11 matches last season:

3, 6, 0, 2, 0, 4, 2, 1, 0, 1, 3

- (a) What is the
(i) mode, (ii) mean, (iii) median
for these data?
(b) What is the range?

2. The class sizes of Year 10 in a school are

32, 29, 30, 31, 28, 30, 33, 27

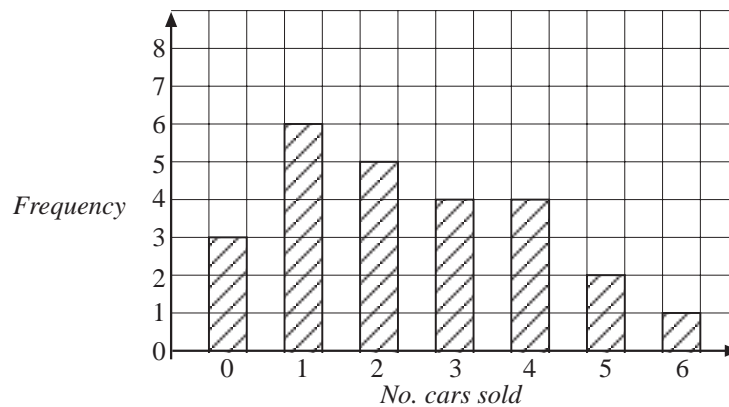
What are the range and the mean class sizes?

The range for Year 11 classes is 12 and the mean class size is 27.

Compare the Year 10 and Year 11 data.

3. The numbers of new cars sold per day over a period of time are shown below.

What is the mean number of cars sold per day?



Quick Check

Foundation Tier

UNIT 9

4. The following list gives the maximum daily temperature, in $^{\circ}\text{C}$, over a month.

| | | | | | | |
|----|----|----|----|----|----|----|
| 12 | 10 | 8 | 10 | 12 | 15 | 17 |
| 18 | 20 | 21 | 16 | 13 | 10 | 6 |
| 7 | 9 | 10 | 12 | 9 | 11 | 15 |
| 17 | 21 | 20 | 19 | 17 | 19 | 18 |
| 14 | 15 | | | | | |

- (a) Copy and complete the grouped frequency table below,

| <i>Temperature, T</i> | <i>Tally</i> | <i>Frequency</i> |
|-----------------------|--------------|------------------|
| $5 < T \leq 10$ | | |
| $10 < T \leq 15$ | | |
| $15 < T \leq 20$ | | |
| $20 < T \leq 25$ | | |

- (b) Use your table to estimate the mean value.
 (c) Draw a histogram to represent the data.

Answers

1. (a) (i) 0 (ii) 2 (iv) 2 (b) 6 3. 2.4
 2. 6, 30: Y11 has generally smaller class sizes, but with wider variation of group numbers. 4. (a) Frequencies 9, 9, 10, 2 (b) 13.3 (1 d.p.)

Quick Check**Foundation Tier****UNIT 10**

1. Put these numbers in order of increasing size:

$-4, 0, 3, -7, -10, 5$

2. Evaluate:

(a) $-6 + 4$ (b) $-3 - 2$ (c) $4 - (-2)$

(d) $3 \times (-2)$ (e) $(-4) \times (-5)$ (f) $6 \div (-2)$

3. Simplify:

(a) $x + 2y + 2x - y$ (b) $2x^2 + x - 3x^2 + 4x$

4. Remove the brackets:

(a) $5(x + 2)$ (b) $x(1 - x)$

5. Solve each of these equations.

(a) $x + 5 = 7$ (b) $4x = 20$ (c) $x - 5 = -2$

6. Pete thinks of a number and doubles it. His answer is 46.

What was the number he thought of?

7. Sue thinks of a number, doubles it, and adds 3. Her answer is 37.

What was the number she thought of?

8. Use 'trial and improvement' method to solve $x^3 = 200$, correct to one decimal place.

Show all your working.

Answers

1. $-10, -7, -4, 0, 3, 5$ 5. (a) 2 (b) 5 (c) 3
2. (a) -2 (b) -5 (c) 6 (d) -6 6. 23
- (e) 20 (f) -3 7. 17
3. (a) $3x + y$ (b) $-x^2 + 5x$ 8. 5.8 (1 d.p.)
4. (a) $5x + 10$ (b) $x - x^2$

Quick Check

Foundation Tier

UNIT 11

- Convert the following to percentages:
 - 0.25
 - $\frac{1}{10}$
 - 0.3
 - $\frac{3}{50}$
- Convert:
 - 20% to a fraction
 - 33% to a decimal
 - 5% to a fraction
 - 5% to a decimal
- Jim has a garden of area 300 m^2 which consists of a lawn, a vegetable patch and a pond.
 - The lawn is 40% of the garden. Calculate the area of the lawn.
 - The vegetable patch has an area of 90 m^2 . What percentage of the garden is taken up by the pond?
- Work out:
 - $\frac{3}{10}$ of £8
 - 30% of £60
 - $\frac{4}{5}$ of 25 metres
- A cake weighs 900 grams of which 20% is sugar. Calculate the weight of sugar in the cake.
- 20 000 tickets were sold at a rail travel centre, of which 3000 were for 1st class travel. What percentage of the total number of tickets were for 1st class travel?
- A television costs £400 plus VAT. VAT is charged at $17\frac{1}{2}\%$.
How much VAT is paid? What is the total cost of the television?
- A building society account pays interest of 7% each year on the total invested. If £500 is invested for one year, what is the interest paid?

Answers

- (a) 25% (b) 10% (c) 30% (d) 6%
- (a) $\frac{1}{5}$ (b) 0.33 (c) $\frac{1}{20}$ (d) 0.05
- (a) 120 m^2 (b) 30%
- (a) £2.40 (b) £18 (c) 20 m
- 180 grams
- 15%
- £70, £470
- £35

Quick Check

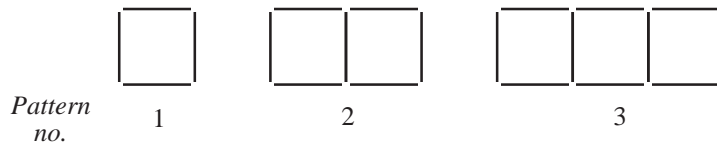
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UNIT 12

1. Write down the next two numbers in each of these sequences:

- (a) 6, 13, 20, 27,,
- (b) 27, 23, 19, 15,,
- (c) 1, 2, 4, 7, 11,,
- (d) 1, 4, 9, 25, 36,,
- (e) 1, 5, 13, 25, 41, 61,,

2.

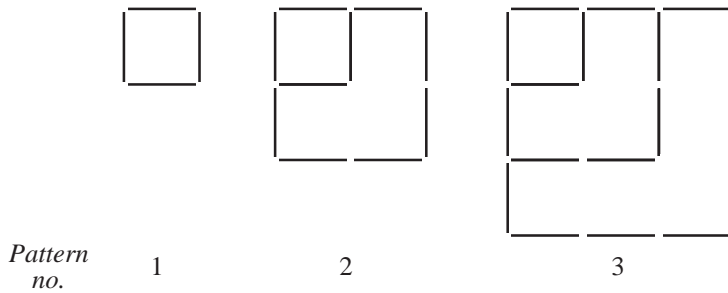


(a) Complete this table:

| | | | | | |
|---------------------|---|---|---|---|---|
| <i>Pattern no.</i> | 1 | 2 | 3 | 4 | 5 |
| <i>No. of edges</i> | 4 | 7 | ? | ? | ? |

- (b) A pattern needs 100 sticks. Which pattern number is this?
- (c) How many sticks are needed to make pattern number 200?

3.



(a) Complete this table:

| | | | | | |
|----------------------------|---|----|---|---|---|
| <i>Pattern no.</i> | 1 | 2 | 3 | 4 | 5 |
| <i>No. of 1 cm lengths</i> | 4 | 10 | ? | ? | ? |

- (b) A pattern needs 70 lengths.
What is the pattern no.?

Answers

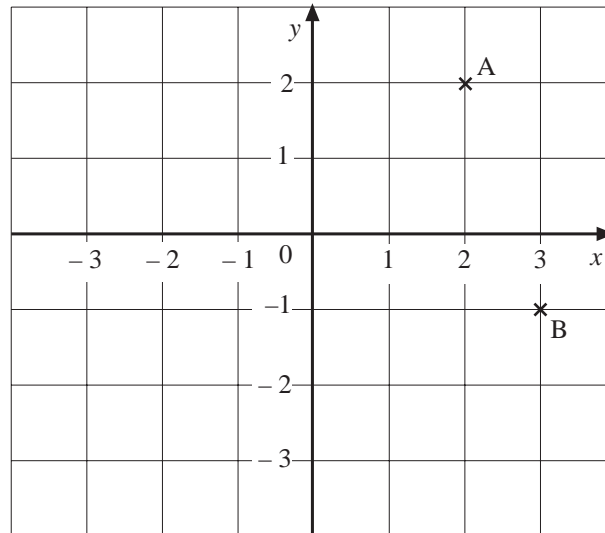
1. (a) 34, 41 (b) 11, 7, (c) 16, 22 3. $\frac{3}{18} \quad \frac{4}{28} \quad \frac{5}{40}$ (b) 7
 (d) 49, 64 (e) 85, 113
2. (a) $\frac{3}{10} \quad \frac{4}{13} \quad \frac{5}{16}$ (b) 33 (c) 601

Quick Check

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UNIT 13

1.



Copy the grid above, and then:

- (a) plot the points C $(-1, -1)$ and D $(-2, 2)$,
- (b) state the coordinates of the points A and B,
- (c) name the shape ABCD.

2. Copy and complete the table of values for $y = x - 1$.

| | | | | | | |
|-----|----|----|---|---|---|---|
| x | -2 | -1 | 0 | 1 | 2 | 3 |
| y | -3 | | | | 1 | |

- (a) Draw the graph of $y = x - 1$ on a grid.
- (b) Plot the points A $(-1, 2)$ and B $(3, -2)$, and draw the line AB.
- (c) The line AB intersects the line $y = x - 1$ at the point C.
What are the coordinates of C?

3. Copy and complete the table of values for $y = x^2 - 1$.

| | | | | | | | |
|-----|----|----|----|---|---|---|---|
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| y | 3 | | | 0 | | | |

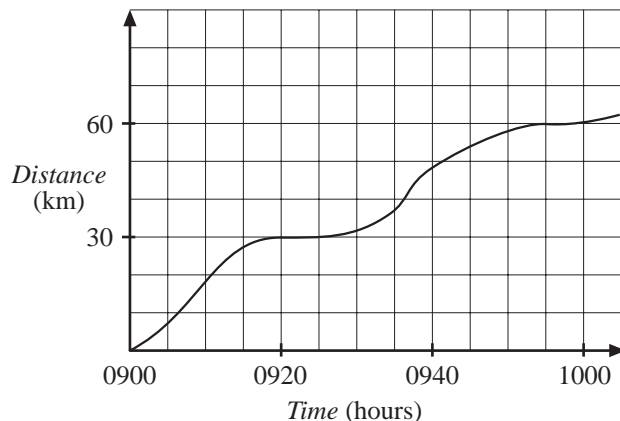
- (a) On a suitable grid with $-3 \leq x \leq 3$ and $-1 \leq y \leq 8$, draw the graph of $y = x^2 - 1$.
- (b) Estimate the values of x when $y = 5$.

Quick Check

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UNIT 13

4. A distance-time graph for a train is illustrated below:



- (a) For how long did it travel before the first stop?
- (b) How far had the train travelled when it stopped for the first time?
- (c) For how long did it stop?
- (d) For how long did it travel before the next stop?

5. Two judges awarded marks out of 20 for each competitor in a dance competition.

| Competitor | A | B | C | D | E | F |
|------------|---|----|----|----|---|----|
| 1st Judge | 8 | 10 | 15 | 12 | 9 | 14 |
| 2nd Judge | 7 | 10 | 13 | 11 | 8 | 12 |

- (a) Draw a scatter diagram to show this information.
- (b) Draw a line of best fit on your scatter diagram.
- (c) Another competitor was given a score of 13 by the first judge. Estimate the mark that you would expect the second judge to give.

Answers

1. (b) A (2, 2). B (3, -1)
 (c) parallelogram

2.

| | | | | | | |
|-----|----|----|----|---|---|---|
| x | -2 | -1 | 0 | 1 | 2 | 3 |
| y | -3 | -2 | -1 | 0 | 1 | 2 |

- (c) (1, 0)

3.

| | | | | | | | |
|-----|----|----|----|----|---|---|---|
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| y | 8 | 3 | 0 | -1 | 0 | 3 | 8 |

- (b) Between 2.4 and 2.5 (+ and -)

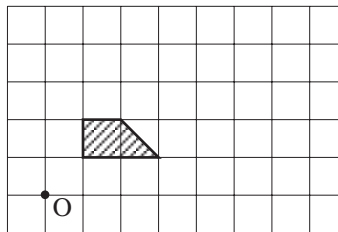
4. (a) 20 minutes (b) 30 km
 (c) 5 minutes (d) 30 minutes
5. (a) 12 (or 11)

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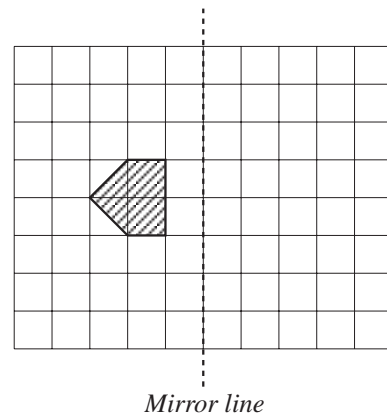
Foundation Tier

UNIT 14

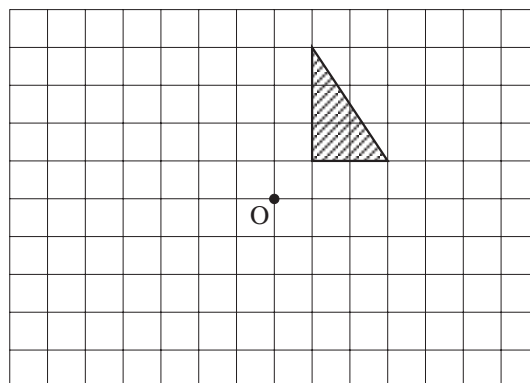
- The plan of a room is drawn using a scale of 1 : 50.
 - On the plan, how many centimetres represent one metre?
 - The width of the room is 5.3 m. How many centimetres represent this on the plan?
- Using only a pencil, a compass and a ruler, draw accurately a triangle with sides of lengths 8 cm, 7 cm and 6 cm.
- Using the point O as the centre of enlargement, on a copy of the grid below, enlarge the shaded shape with scale factor 2.



- Copy the grid and shape shown opposite. Reflect the shape in the given mirror line.



- Draw a line AB of length 5 cm. Construct the locus of the point which is 1 cm away from this line.
- Copy the grid and shape shown below.



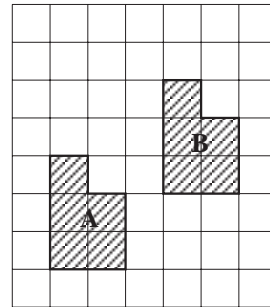
- Rotate the shape clockwise through 90° about the point O, and label the new shape 'B'.
- Rotate the original shape anticlockwise through 180° about the point O, and label the new shape 'C'.
- What rotation will take shape B to shape C?

Quick Check

Foundation Tier

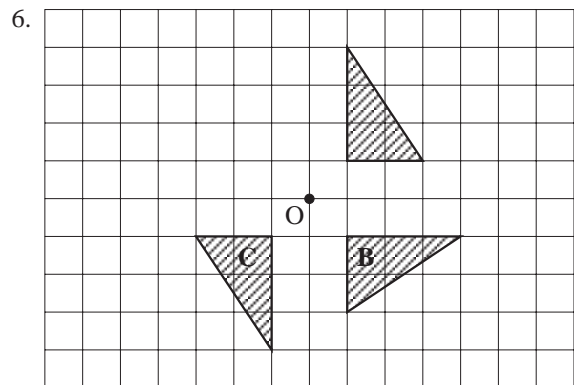
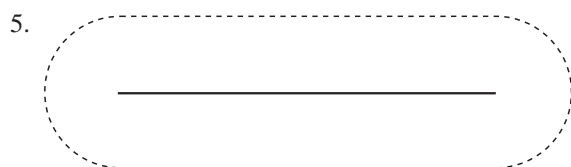
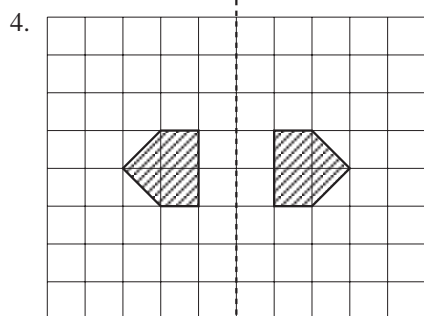
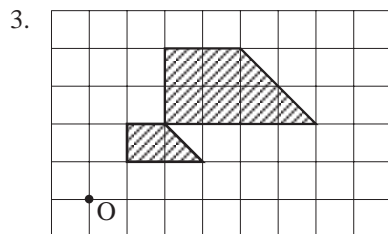
UNIT 14

7. Describe the transformation that takes:
- (a) shape A to B,
 - (b) shape B to A.



Answers

1. (a) 2 cm (b) 10.6 cm



- (c) Rotation about O, 90° clockwise or 270° anticlockwise.

7. (a) Translation $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$
- (b) Translation $\begin{pmatrix} -3 \\ -2 \end{pmatrix}$

Quick Check

Foundation Tier

UNIT 15

1. The ratio of red Smarties to other colours in a large box of Smarties is 1 : 6.
If there are 84 Smarties in total in the box, how many of them would you expect to be red?
2. In a plane, there are 12 First Class seats and 84 Economy seats.
What is the ratio of First Class seats to Economy seats?
3. If the length 6 cm is enlarged in the ration 2 : 3, what is the new length?
4. There are 2 sizes of jam, large and small.
A large jar costs £1.37 and weighs 1 kg.
A small jar costs 38p and weighs 350 gm.
Which is the best value?
5. On a map of scale 1 : 200 000, the distance between two cities is 5 cm. What is the actual distance between the cities in km?
6. On a map of scale 1 : 50 000, what is the distance, in cm, between two towns which are 40 km apart?

Answers

- | | |
|--|----------|
| 1. 12 | 5. 10 km |
| 2. 1 : 7 | 6. 80 cm |
| 3. 9 cm | |
| 4. Prices per gm: large = 0.137p, small = 0.108p, so 'small' is better value. | |

Quick Check

Foundation Tier

UNIT 16

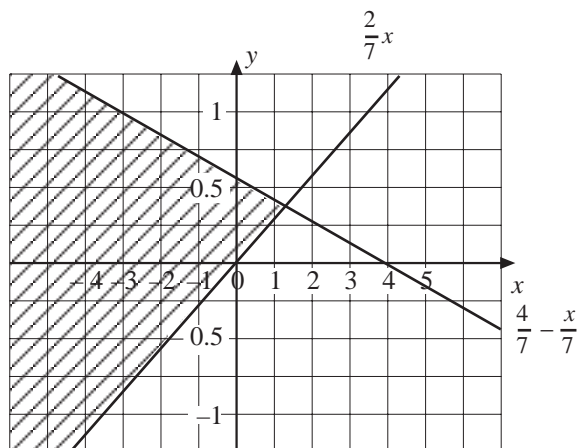
1. List all integers that satisfy:
 - (a) $1 \leq x \leq 3$
 - (b) $-1 \leq x < 5$
 - (c) $-7 < x < -5$

2. Solve the inequalities:
 - (a) $2x + 5 \leq 13$
 - (b) $3x - 7 > 23$
 - (c) $4 - x \geq 7$

3. On a rectangular grid, illustrate the inequality $4 - x \geq 7y \geq 2x$.

Answers

1. (a) 1, 2, 3 (b) -1, 0, 1, 2, 3, 4 (c) -6
2. (a) $x \leq 4$ (b) $x > 10$ (c) $x \leq -3$
- 3.



Region required:

$$y \geq \frac{2}{7}x$$

$$y \leq \frac{4}{7} - \frac{x}{7}$$