Cambridge IGCSE

**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

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**MATHEMATICS** **0580/33**

Paper 3 (Core) **May/June 2015**

**2 hours**

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For $\pi$, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 104.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.



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CAMBRIDGE International Examinations

**1** **(a)** The number of trains stopping each day, for 20 days, at Pherlak Station is recorded below.

View solution

15 14 16 14 13 13 12 15 16 15

14 13 14 13 13 12 11 12 10 10

**(i)** Complete the table to show the frequency of the number of trains stopping each day.

| Number of trains stopping each day | Tally | Frequency |
|---|---|---|
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |

[2]

**(ii)** Write down the modal number of trains stopping each day.

View solution

*Answer(a)*(ii) ..... [1]

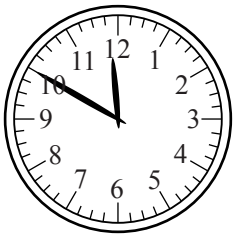
**(iii)** Work out the mean number of trains stopping each day.

View solution

*Answer(a)*(iii) ..... [2]

**(iv)** The time of the last train to leave one night is shown on this clock.

View solution




Write down this time using the 24-hour clock.

*Answer(a)*(iv) ..... [1]

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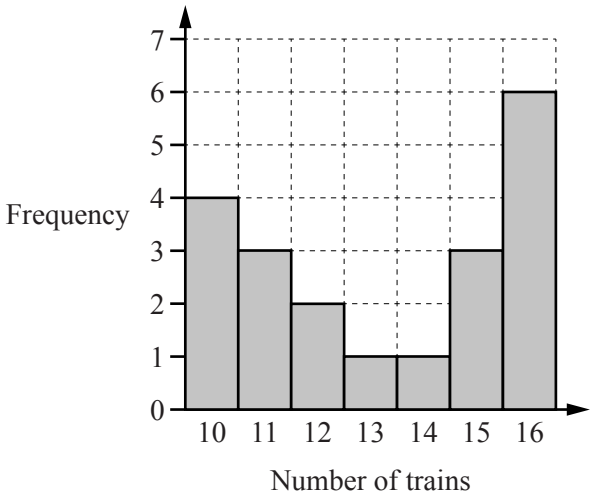
**(b)** This bar chart shows the number of trains stopping each day, for 20 days, at Sparke Station.

View solution




**(i)** Write down the modal number of trains stopping each day at Sparke Station.

*Answer(b)*(i) ..... [1]

**(ii)** Write down the range of the number of trains stopping each day at Sparke Station.

View solution

*Answer(b)*(ii) ..... [1]

**(iii)** Write one comment comparing the number of trains stopping each day at Pherlak Station to those stopping at Sparke Station.

View solution

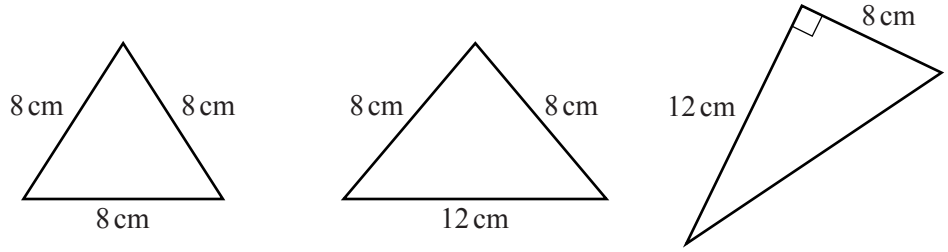
*Answer(b)*(iii) .....

.....

..... [1]

**2** **(a)** Write the mathematical name under each of these triangles.

View solution



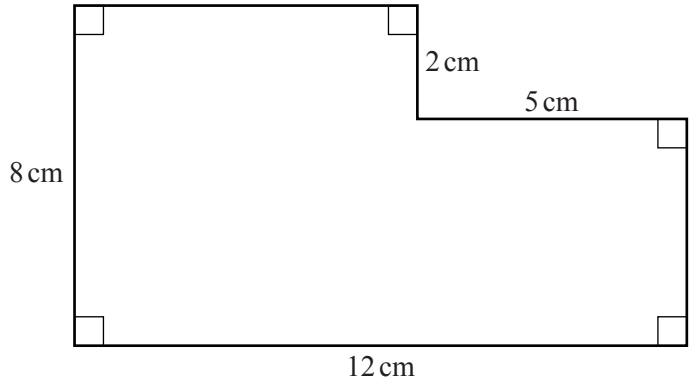

NOT TO SCALE

..... ..... .....

[3]

**(b)**

View solution




NOT TO SCALE

**(i)** Find the perimeter of this shape.

*Answer(b)*(i) ..... cm [1]

**(ii)** Find the area of this shape.
Give the units of your answer.

View solution

*Answer(b)*(ii) ..... ..... [3]

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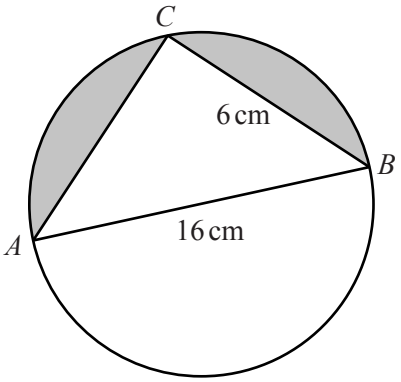
**(c)**




NOT TO SCALE

View solution

In the diagram $AB$ is the diameter of the circle and $C$ is a point on the circumference.
$AB = 16$ cm and $BC = 6$ cm.

**(i)** Give a reason why angle $ACB = 90°$.

*Answer(c)*(i) .....

..... [1]

**(ii)** Calculate $AC$.

View solution

*Answer(c)*(ii) $AC =$ ..... cm [3]

**(iii)** Calculate the shaded area.

View solution

*Answer(c)*(iii) .....$cm^2$ [5]

**3** One day Raphael asked 90 people at a station the reason for their train journey.

**(a)** **(i)** Complete the table which shows the angles for the sectors in a pie chart.

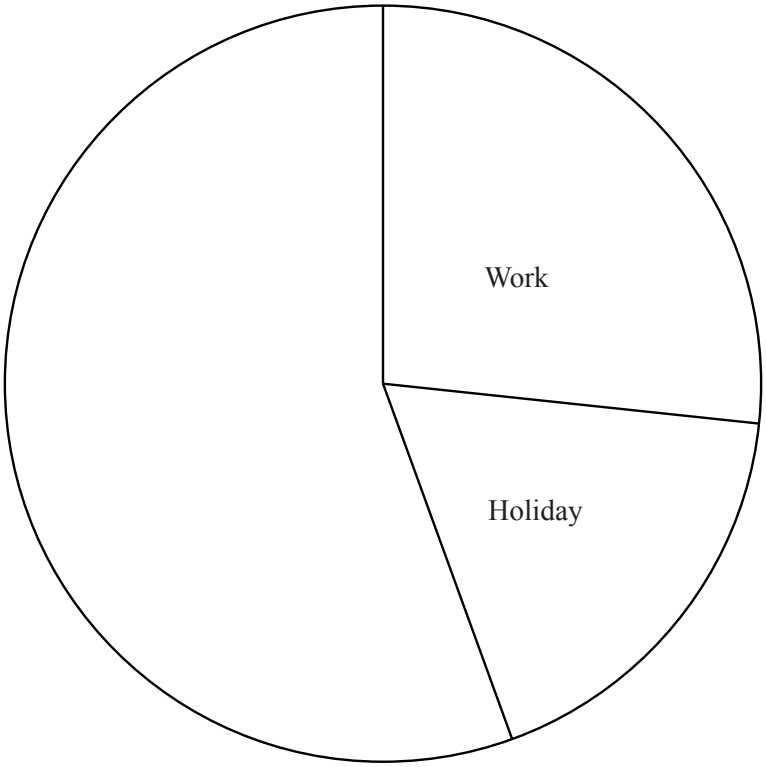
View solution

| Reason | Frequency | Angle |
|---|---|---|
| Work | 24 | 96° |
| Holiday | 16 | 64° |
| Shopping | 19 | |
| Other | 31 | |

[2]

**(ii)** Complete the pie chart to show this information.

View solution




[1]

**(b)** Raphael selects one person at random.

View solution

Write down the probability that this person is going to work.
Give your answer as a fraction in its simplest form.

*Answer(b)* ..... [2]

**(c)** 405 people used the station that day.

View solution

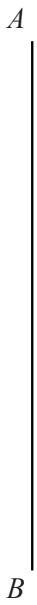
Using Raphael's information, calculate how many of the 405 people are likely to be going on holiday.

*Answer(c)* ..... [2]

**4** In triangle $ABC$, $AC = 10$ cm and $BC = 9$ cm.

**(a)** **Using a ruler and compasses only**, construct this triangle below.
$AB$ has been drawn for you.

View solution




[2]

**(b)** **Using a straight edge and compasses only**, construct the bisector of angle $ABC$.
Continue the bisector until it meets the line $AC$ at $D$.
Mark the point $D$ on your diagram. [2]

View solution

**(c)** Measure $BD$.

View solution

*Answer(c)* $BD =$ ..... cm [1]

**(d)** Your diagram shows the positions of three towns $A$, $B$ and $C$ on a map.
$A$ is due North of $B$.

View solution

Measure the bearing of $C$ from $A$.

*Answer(d)* ..... [1]

**5** Indira makes a playground for children.

**(a)** She borrows \$40 000 for 5 years at a rate of 3.6% per year simple interest.

View solution

Calculate the total amount she will owe at the end of 5 years.

*Answer(a)* \$ ..... [3]

**(b)** Bandhura works at the playground for 28 hours.
She is paid \$15.85 per hour.

View solution

Calculate the total amount Bandhura is paid.

*Answer(b)* \$ ..... [1]

**(c)** To visit the playground each adult pays \$1.25 and each child pays \$3.50 .
One day 24 adults and 32 children visit the playground.

View solution

Calculate how much they pay altogether.

*Answer(c)* \$ ..... [3]

**(d)** On another day 180 people visit the playground.
These people are in the ratio

View solution

adults : boys : girls = 3 : 2 : 7.

Calculate the numbers of adults, boys and girls.

*Answer(d)* Adults = .....

Boys = .....

Girls = ..... [3]

**(e)** The opening hours for the playground are shown below.

View solution

| | |
|---|---|
| Monday | Closed |
| Tuesday | 08 30 to 17 15 |
| Wednesday | 08 30 to 17 15 |
| Thursday | 08 30 to 17 15 |
| Friday | 08 30 to 18 00 |
| Saturday | 08 30 to 17 15 |
| Sunday | 09 00 to 17 00 |

Calculate the total number of hours that the playground is open in the week.

*Answer(e)* ..... hours [2]

View solution

**(f)** Indira introduces a family ticket for \$7.95 .
21 families buy this ticket.

By rounding both numbers to 1 significant figure, **estimate** how much Indira receives.
Show clearly how you worked out your estimate.

*Answer(f)* \$ ..... [2]

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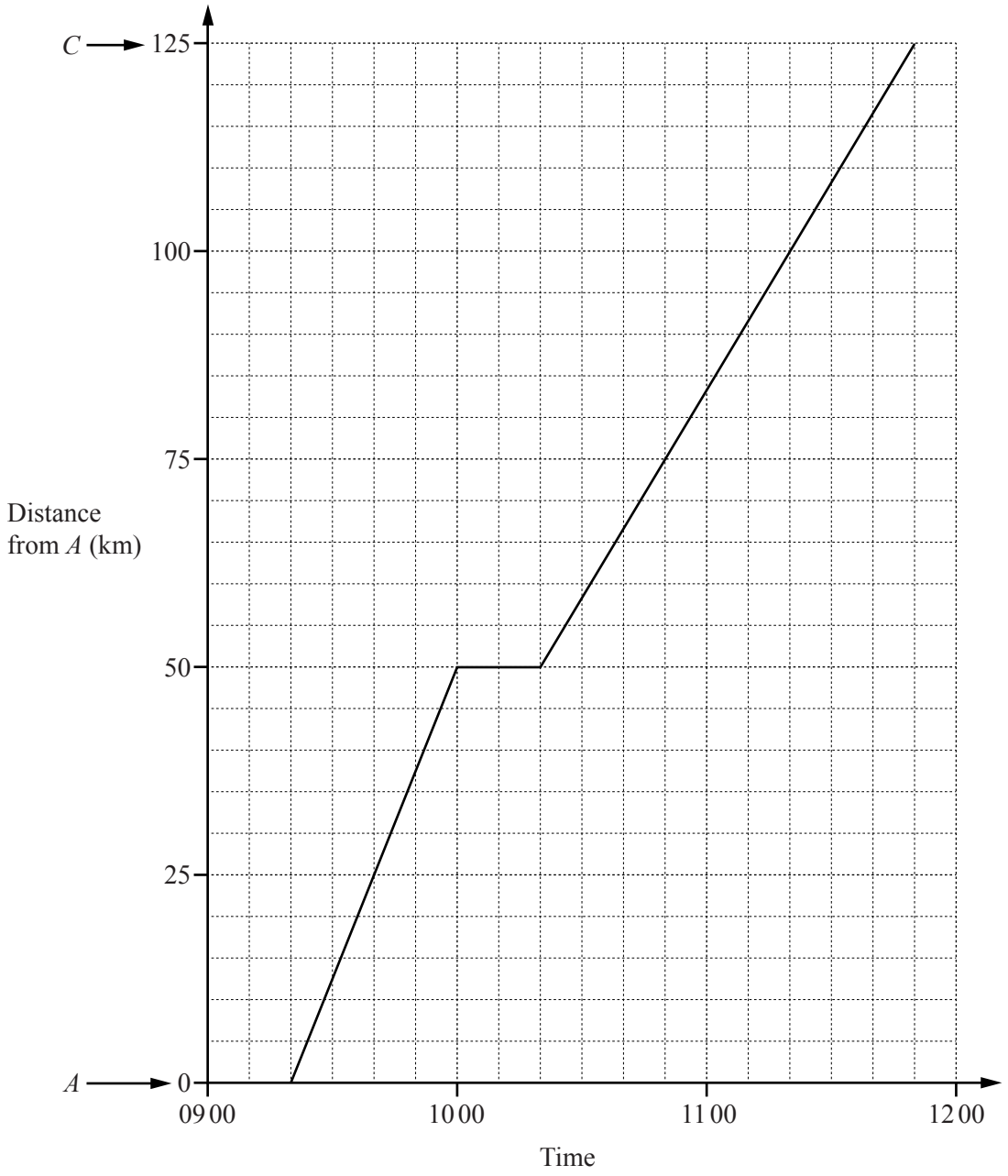
**6** The travel graph shows a journey of a train from *A* to *C*, stopping at *B*.




**(a)** Write down the time that the train leaves *A*.

View solution

*Answer(a)* ..... [1]

**(b)** Write down the time that the train stops at *B*.

View solution

*Answer(b)* ..... [1]

**(c)** For how many minutes did the train stop at *B*?

View solution

*Answer(c)* ..... min [1]

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**(d)** Work out the average speed of the train between $A$ and $C$.

View solution

*Answer(d)* ..... km/h [3]

**(e)** Another train leaves $C$ at 09 50 and arrives at $A$ at 11 40 without stopping.
It travels at a constant speed.

View solution

**(i)** On the grid, draw the travel graph for this train. [1]

**(ii)** At what time do the two trains pass each other?

View solution

*Answer(e)*(ii) ..... [1]

**(f)** A ticket from $A$ to $C$ costs 2345 rupees.
The exchange rate is 1 rupee = \$0.024 .

View solution

Calculate the cost of the ticket in dollars.

*Answer(f)* \$ ..... [1]

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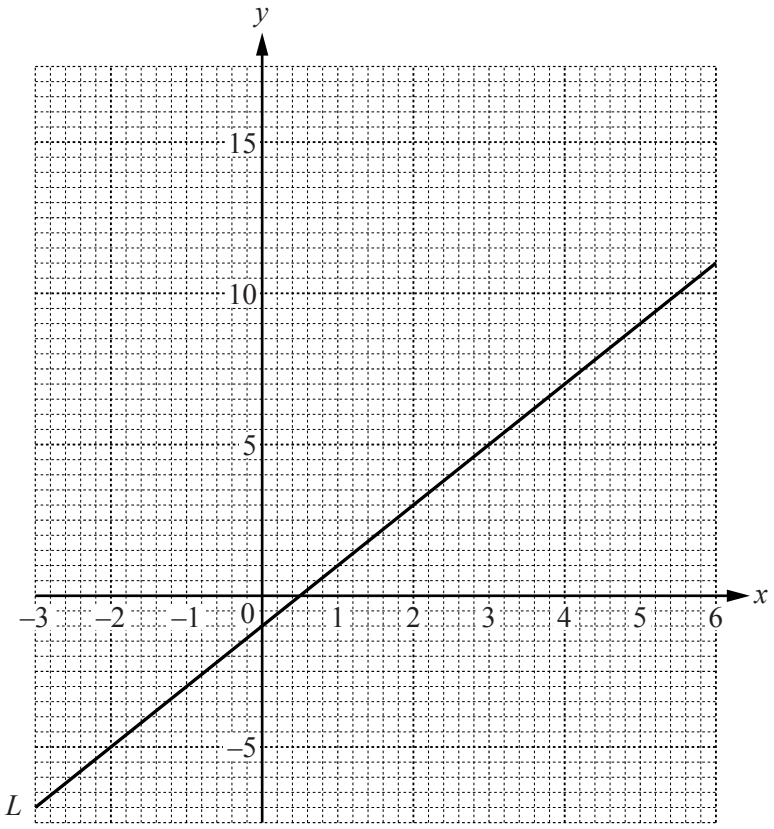
**7** **(a)** The grid below shows the straight line $L$.

View solution




The equation of the line $L$ is $y = 2x + c$.

Find the value of $c$.

*Answer(a)* $c =$ ..... [1]

View solution

**(b)** **(i)** Complete the table of values for $y = x^2 - 3x - 2$.

| $x$ | –3 | –2 | –1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|
| $y$ | | 8 | 2 | | –4 | –4 | | 2 | 8 | |

[2]

**(ii)** On the grid, draw the graph of $y = x^2 - 3x - 2$ for $-3 \leqslant x \leqslant 6$. [4]

**(iii)** Write down the values of $x$ where the line $L$ intersects the curve $y = x^2 - 3x - 2$.

*Answer(b)*(iii) $x =$ ..... and $x =$ ..... [2]

**8** **(a)** **(i)** $A = 4\pi r^2$

View solution

Work out the value of $A$ when $r = 5.6$ .
Give your answer correct to 1 decimal place.

*Answer(a)*(i) $A =$ ..... [2]

**(ii)** Simplify the expression.

View solution

$$2a - b + 5a - 3b$$

*Answer(a)*(ii) ..... [2]

**(iii)** Solve the equation.

View solution

$$\frac{x}{3} = 6$$

*Answer(a)*(iii) $x =$ ..... [1]

**(iv)** Solve the equation.

View solution

$$x - 2 = 9$$

*Answer(a)*(iv) $x =$ ..... [1]

**(b)** Solve the simultaneous equations.
You must show all your working.

View solution

$$2x + 3y = 4$$
$$3x - 4y = 23$$

*Answer(b)* $x =$ .....

$y =$ ..... [4]

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**9** **(a)** Here are the first four terms of a sequence.

View solution

5 8 11 14

**(i)** Write down the next term in this sequence.

*Answer(a)*(i) ..... [1]

**(ii)** Write down the rule for finding the next term of this sequence.

View solution

*Answer(a)*(ii) ..... [1]

**(iii)** Find an expression for the $n$th term of this sequence.

View solution

*Answer(a)*(iii) ..... [2]

**(iv)** Explain why the number 300 is not in this sequence.

View solution

*Answer(a)*(iv) ..... [1]

**(b)** Here are the first four terms of another sequence.

View solution

4 7 11 16

**(i)** Write down the next two terms in this sequence.

*Answer(b)*(i) ..... , ..... [2]

**(ii)** Write down the rule for continuing this sequence.

*Answer(b)*(ii) ..... [1]

---

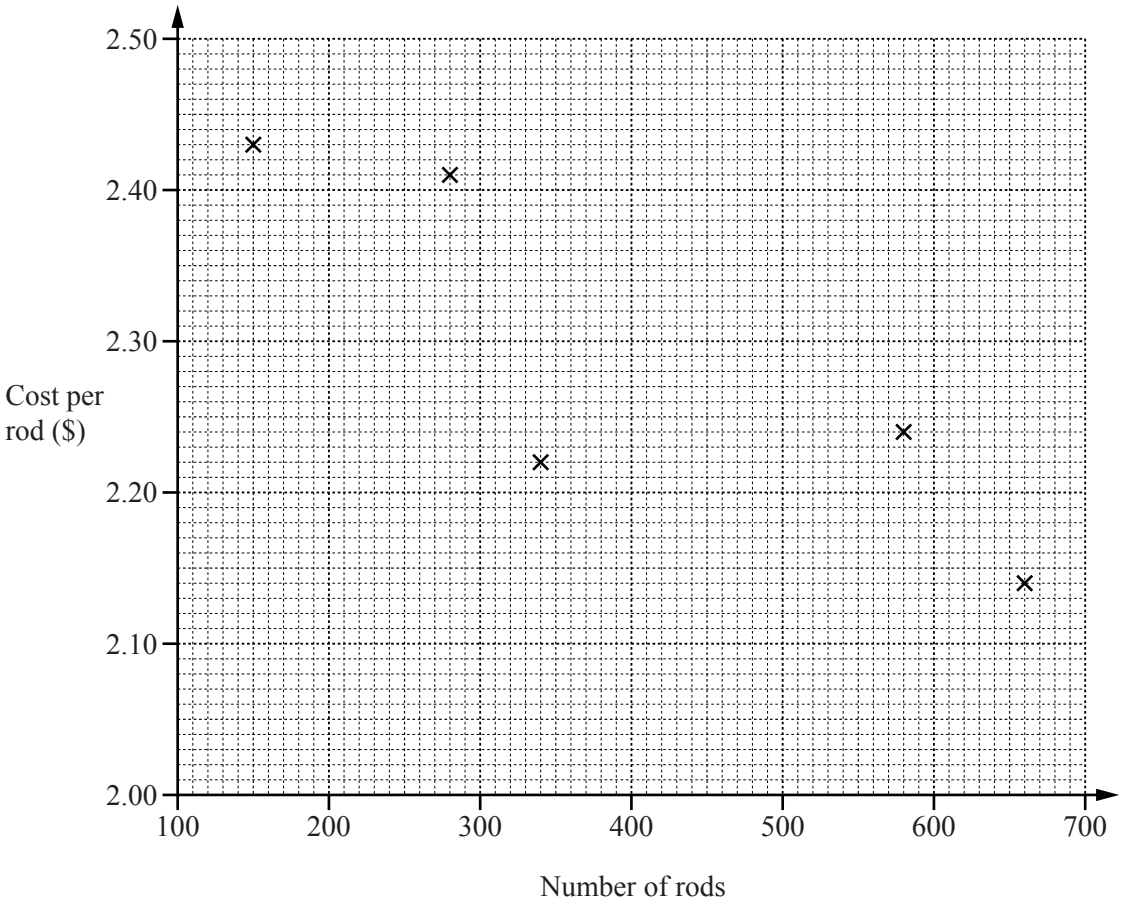
View solution

**10** A manufacturer makes rods.
Each day he records the number of rods made and the cost, in dollars, of making each rod.

| Number of rods | 660 | 340 | 150 | 580 | 280 | 520 | 310 | 480 |
|---|---|---|---|---|---|---|---|---|
| Cost per rod ($) | 2.14 | 2.22 | 2.43 | 2.24 | 2.41 | 2.18 | 2.30 | 2.28 |

View solution

**(a)** Complete the scatter diagram.
The first five points have been plotted for you.




[2]

View solution [1]

**(b)** Draw a line of best fit.

View solution

**(c)** What type of correlation is shown by the scatter diagram?

*Answer(c)* ..... [1]

**(d)** When 400 rods are made, use your line of best fit to estimate the cost of each rod.

View solution

*Answer(d)* $ ..... [1]

**(e)** On another day the cost per rod is $2.20 .

Estimate the number of rods made.

View solution

*Answer(e)* ..... [1]

**Question 11 is printed on the next page.**

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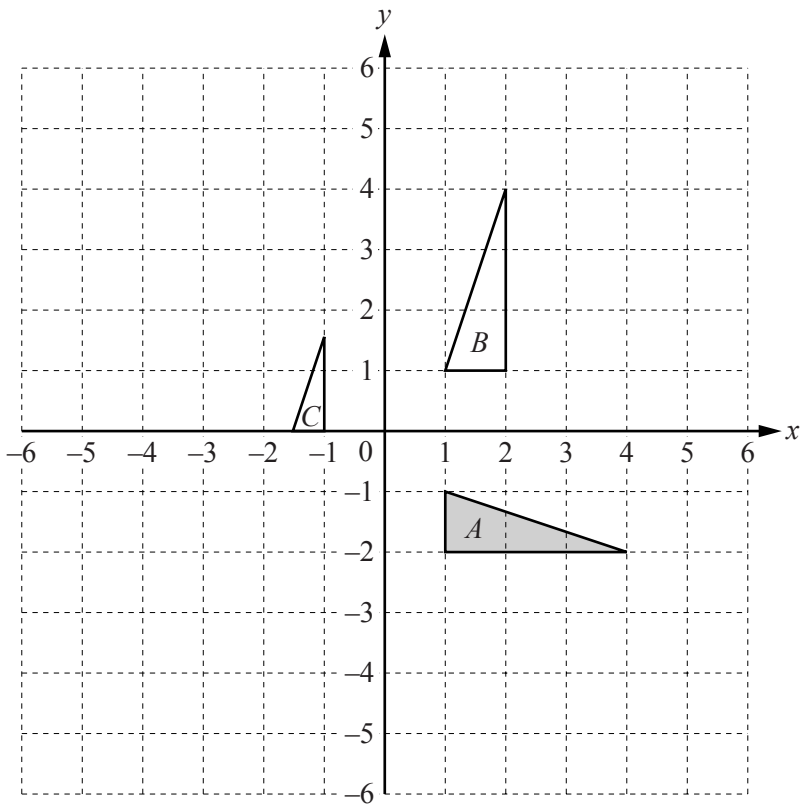
**11**




View solution

**(a)** Reflect triangle $A$ in the line $y = -3$. [2]

View solution

**(b)** Translate triangle $A$ by the vector $\begin{pmatrix} -5 \\ 4 \end{pmatrix}$. [2]

View solution

**(c)** Describe fully the **single** transformation that maps

**(i)** triangle $A$ onto triangle $B$,

*Answer(c)*(i) .....

..... [3]

**(ii)** triangle $C$ onto triangle $B$.

View solution

*Answer(c)*(ii) .....

..... [3]

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