UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS (SYLLABUS D) **4024/11**

Paper 1 **May/June 2013**

2 hours

Candidates answer on the Question Paper.

Additional Materials: 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 a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

If working is needed for any question it must be shown in the space below that question.
Omission of essential working will result in loss of marks.

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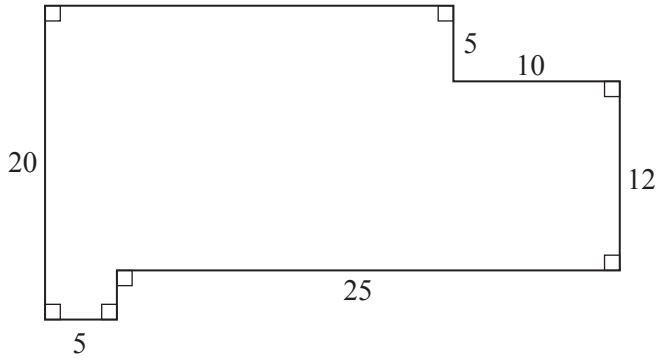
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 80.

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1 In this shape all the lengths are in centimetres.



Work out

(a) the perimeter,

Answer ..... cm [1]

(b) the area.

Answer .....cm^2 [1]

---

2 Evaluate

(a) 0.3×0.2,

Answer ..... [1]

(b) $3.5 \div 0.07$.

Answer ..... [1]

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3 **(a)** A bag containing fruit has mass 3.813 kilograms.
When the bag is empty its mass is 257 grams.

Find, in kilograms, the mass of the fruit.

Answer ..... kg [1]

(b) The area of a shape is $1.2\,m^2$.

Convert this area to cm^2.

Answer ..... cm^2 [1]

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4 **(a)** Complete the statement in the answer space using one of these symbols.

$\leqslant$	$<$	$=$	$>$	$\geqslant$

Answer 0.65 ..... $\frac{27}{40}$ [1]

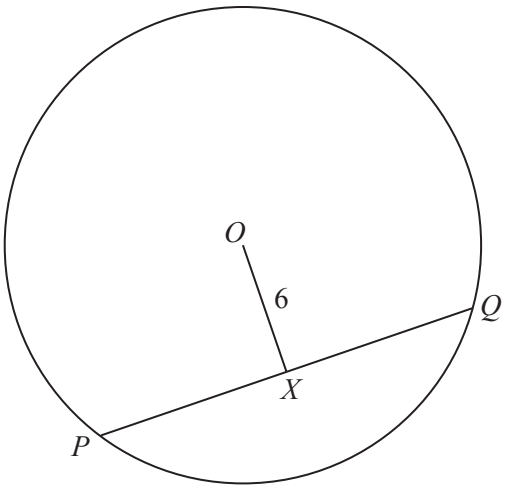
(b) Express 7% as a decimal.

Answer ..... [1]

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PQ is a chord of the circle, centre *O*.
X is the midpoint of *PQ*.
OX = 6 cm and the radius of the circle is 10 cm.

Calculate *PQ*.

Answer ..... cm [2]

6 A bag contains red, yellow and green sweets.
$\frac{2}{5}$ of the sweets are red and $\frac{1}{4}$ of the sweets are yellow.

What fraction of the sweets are green?

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Answer ..... [2]

---

7 On a map the length of a lake is 4.5 centimetres.
The actual length of the lake is 2.7 kilometres.

Write the scale of the map as a ratio in the form 1 : n.

Answer 1 : ..... [2]

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[Turn over

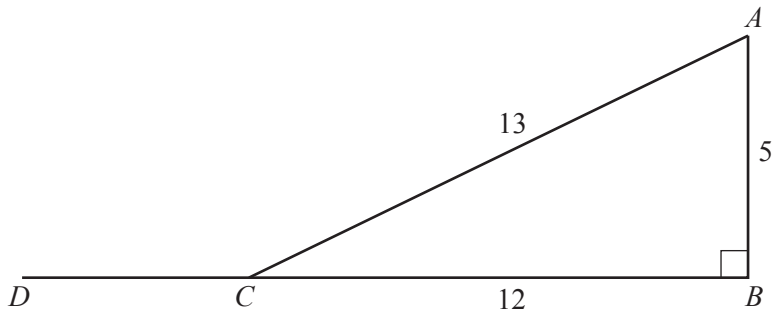
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8 **(a)** One approximate solution of the equation $\sin x° = 0.53$ is $x = 32$.

Use this value of x to find the solution of the equation that lies between 90° and 180°.

Answer ..... [1]

(b)



Triangle ABC is right-angled at B and BC is produced to D.
$AB = 5$ cm, $BC = 12$ cm and $AC = 13$ cm.

Write down the value of $\cos A\hat{C}D$.

Answer $\cos A\hat{C}D =$ ..... [1]

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9 Ahmed pays a total of \$81 for wood, paint and a hammer.

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(a) The amounts he pays for the wood, paint and hammer are in the ratio 4 : 3 : 2.

Calculate how much Ahmed pays for the hammer.

Answer \$ ..... [1]

(b) When Ahmed paid \$81 he had received a 10% discount on the normal price.

Calculate the normal price.

Answer \$ ..... [2]

---

10 $b = m(a - c)$

(a) Evaluate b when $m = 5$, $a = 8$ and $c = -3$.

Answer $b =$ ..... [1]

(b) Rearrange the formula to make c the subject.

Answer $c =$ ..... [2]

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11 Choose a quadrilateral from the list to complete each statement.

Kite	**Parallelogram**	**Rectangle**	**Rhombus**	**Square**	**Trapezium**

(a) A ..... has four equal sides and four angles of 90°. [1]

(b) A ..... has just one pair of parallel sides. [1]

(c) A ..... has just one pair of opposite angles equal and its diagonals bisect at 90°. [1]

12



The three cards above can be rearranged to make three-digit numbers, for example 916.

Arrange the three cards to make

(a) the three-digit number that is closest to 650,

Answer ..... [1]

(b) the three-digit number that is a multiple of 7,

Answer ..... [1]

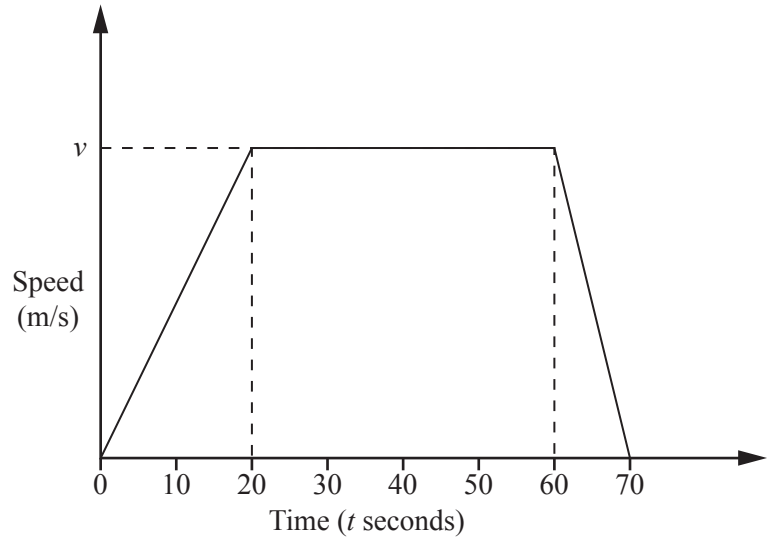
(c) a three-digit number that is a square number.

Answer ..... [1]

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The diagram shows the speed-time graph for 70 seconds of a car's journey.
After 20 seconds the car reaches a speed of v m/s.
During the 70 seconds the car travels 1375 m.

(a) Calculate v.

Answer $v =$ ..... [2]

(b) Calculate the acceleration of the car during the first 20 seconds.

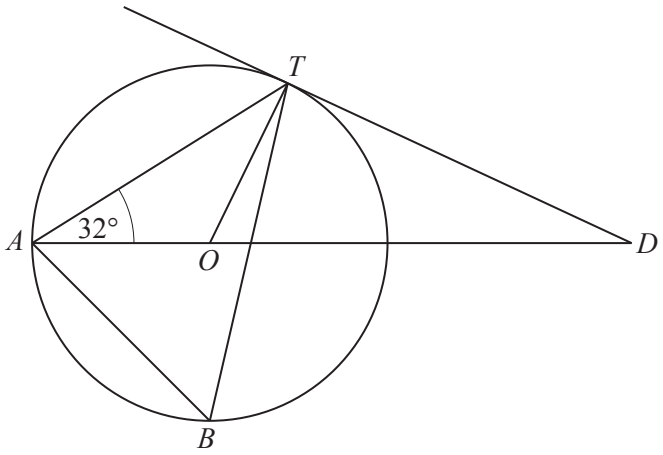
Answer ..... m/s^2 [1]

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14

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A, B and *T* are points on a circle, centre *O*.
AOD is a straight line and *DT* is a tangent to the circle at *T*.
$T\hat{A}O = 32°$

Find

(a) $A\hat{T}O$,

Answer $A\hat{T}O =$ ..... [1]

(b) $T\hat{D}O$,

Answer $T\hat{D}O =$ ..... [1]

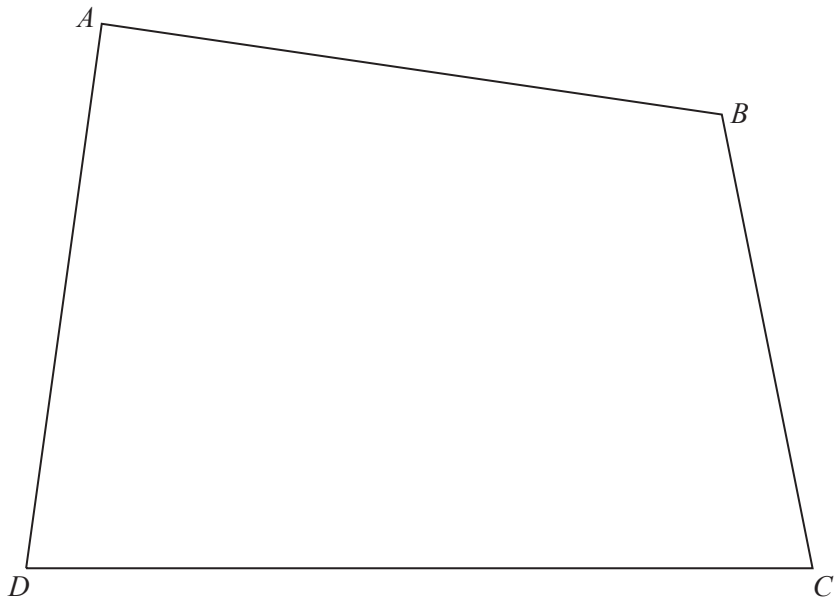
(c) $A\hat{B}T$.

Answer $A\hat{B}T =$ ..... [1]

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(a) Construct the locus of all points, **inside** the quadrilateral $ABCD$, which are

(i) equidistant from DA and DC, [1]

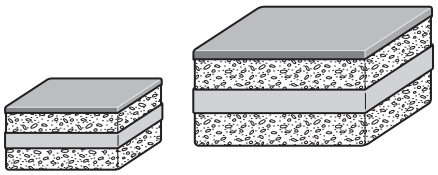
(ii) 5 cm from B. [1]

(b) On the diagram, shade the region **inside** the quadrilateral containing the points that are

nearer to DA than DC **and**

more than 5 cm from B. [1]

16 Maryam makes two geometrically similar cakes.
The heights of the cakes are 6 cm and 9 cm.



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(a) Maryam decorates each cake with a ribbon around the outside.
The length of the ribbon for the larger cake is 66 cm.

Find the length of the ribbon for the smaller cake.

Answer ..... cm [1]

(b) Maryam uses 1600 m^3 of cake mixture to make the smaller cake.

Find the volume of cake mixture she uses to make the larger cake.

Answer .....cm^3 [2]

---

17 $p = 2.4 \times 10^2$ $q = 6 \times 10^3$

Giving your answers in standard form, find

(a) $p + q$,

Answer ..... [1]

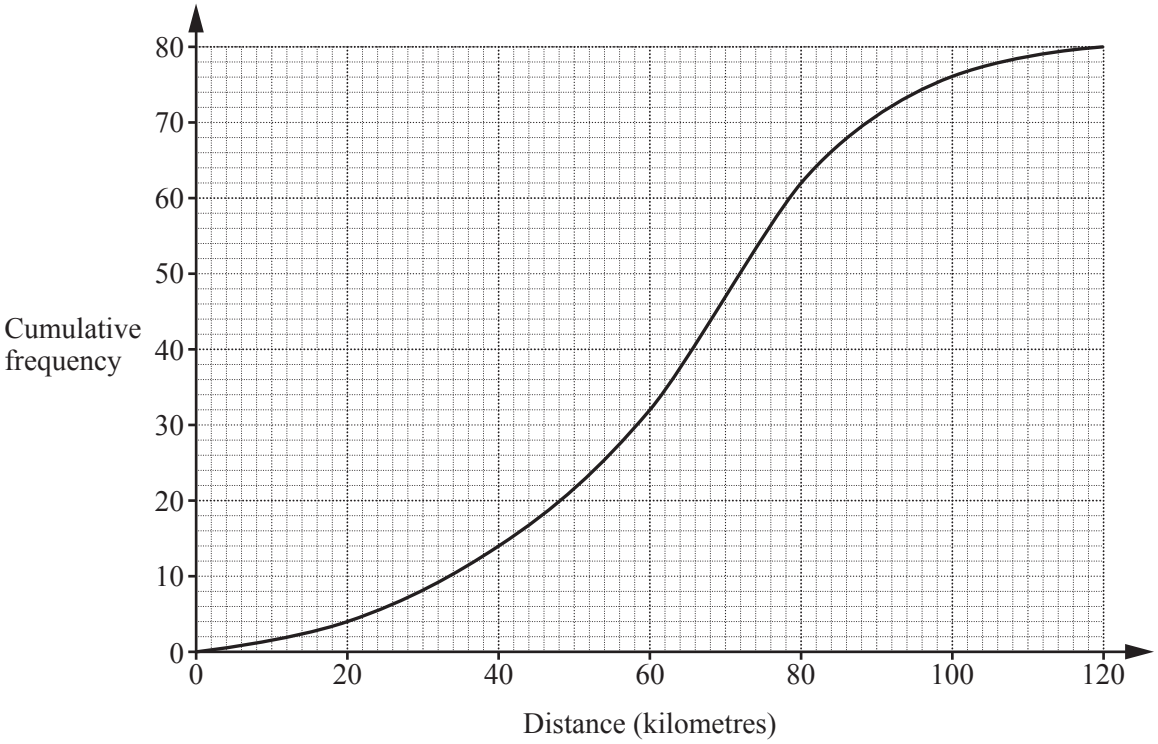
(b) $2p \div q$.

Answer ..... [2]

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18 Eighty cyclists were each asked the distance (in kilometres) they cycled last week.

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The cumulative frequency diagram represents the results.

Use the graph to estimate

(a) the number of cyclists who cycled between 60 and 80 kilometres,

Answer .....[1]

(b) the median distance cycled,

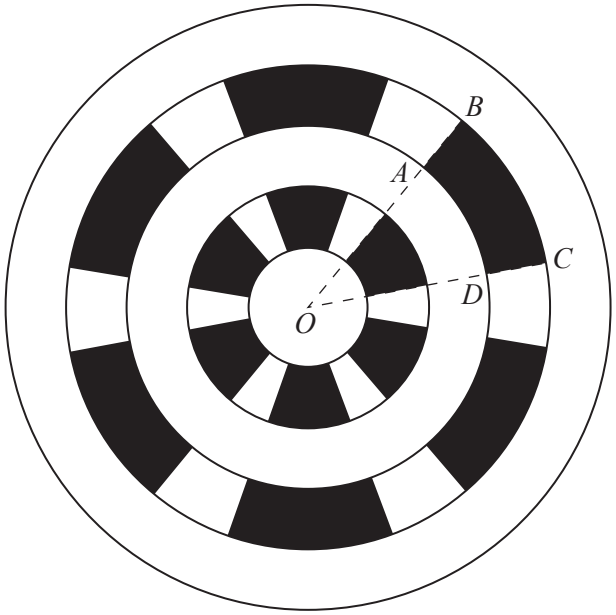
Answer .....km [1]

(c) the interquartile range for the distance cycled.

Answer .....km [2]

19 The diagram shows the metal cover for a circular drain.
Water drains out through the shaded sections.

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O is the centre of circles with radii 1 cm, 2 cm, 3 cm, 4 cm and 5 cm.
The cover has rotational symmetry of order 6 and $B\hat{O}C = 40°$.

(a) Calculate the area of the shaded section $ABCD$, giving your answer in terms of π.

Answer .....cm^2 [2]

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(b) The total area of the metal (unshaded) sections of the cover is $\frac{55}{3}\pi\,\text{cm}^2$.

(i) Calculate the total area of the shaded sections, giving your answer in terms of π.

Answer .....cm^2 [1]

(ii) Calculate the fraction of the total area of the cover that is metal (unshaded).
Give your answer in its simplest form.

Answer ..... [1]

---

20 **(a)** Evaluate

(i) $5^0 + 5^2$,

Answer ..... [1]

(ii) $36^{\frac{1}{2}}$,

Answer ..... [1]

(iii) $(2^{\frac{2}{3}})^6$.

Answer ..... [1]

(b) $\left(\frac{1}{3}\right)^k = 9$

Find the value of k.

Answer $k =$ ..... [1]

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21 R is directly proportional to the **cube** of p.
When $p = 2$, $R = 24$.

(a) Find the formula for R in terms of p.

Answer $R =$ ..... [1]

(b) Find the value of p when $R = 192$.

Answer $p =$ ..... [2]

(c) Which of the diagrams below represents the graph of R against p?

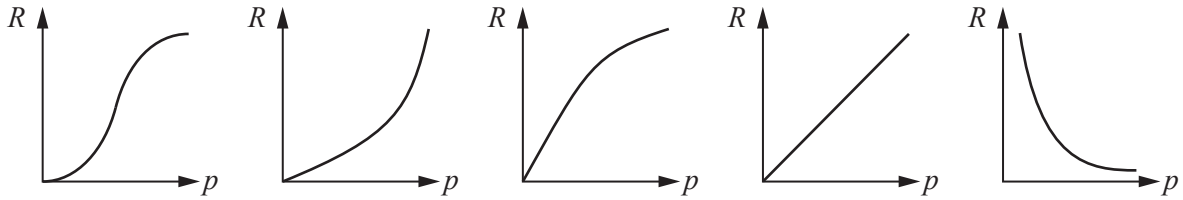
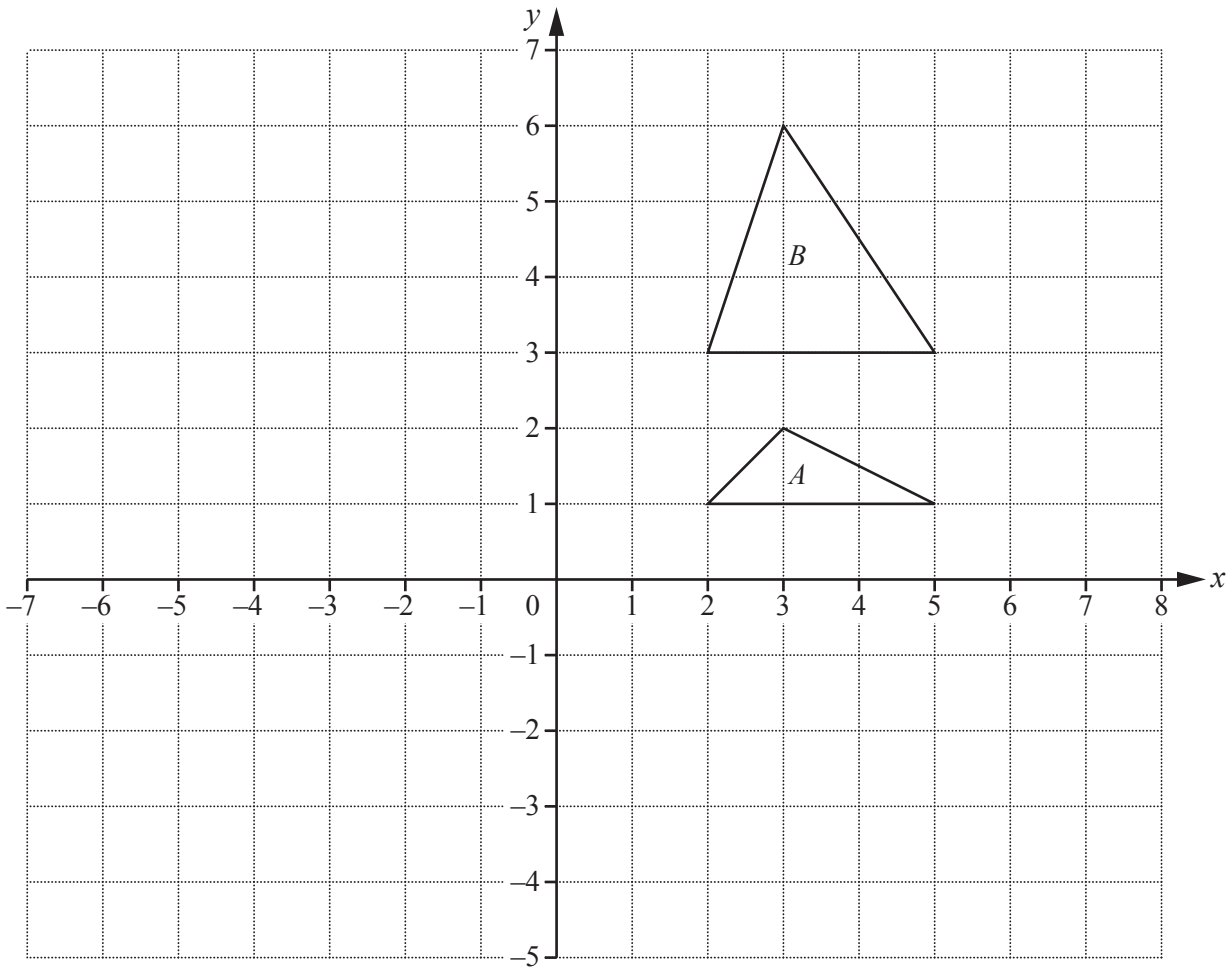


Diagram 1 Diagram 2 Diagram 3 Diagram 4 Diagram 5

Answer Diagram ..... [1]

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The diagram shows triangles *A* and *B*.

(a) The translation $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$ maps triangle *A* onto triangle *C*.

On the diagram, draw and label triangle *C*. [1]

(b) The rotation 90° clockwise, centre (1, 1), maps triangle *A* onto triangle *D*.

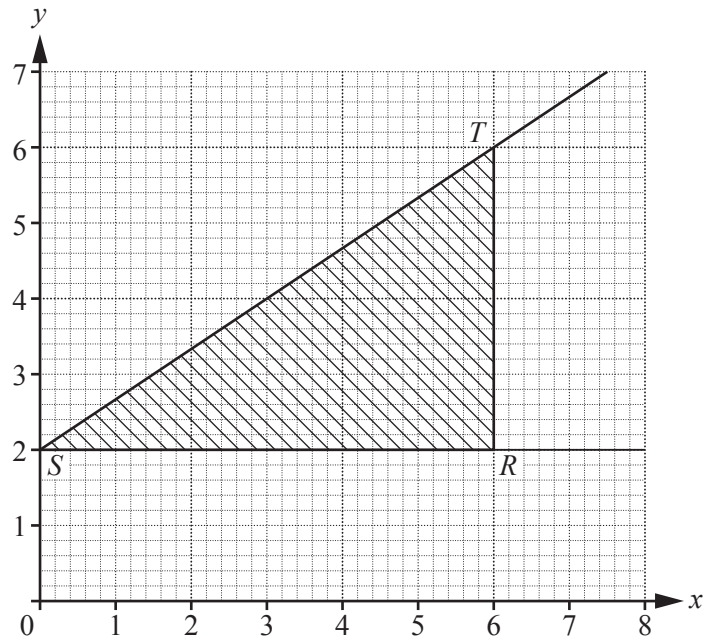
On the diagram, draw and label triangle *D*. [2]

(c) Find the matrix of the transformation that maps triangle *A* onto triangle *B*.

Answer $\begin{pmatrix} & \\ & \end{pmatrix}$ [1]

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The diagram shows a triangle *RST*.

(a) Write down

(i) the gradient of the line *ST*,

Answer .....[1]

(ii) the equation of a line that is parallel to *ST*,

Answer .....[1]

(iii) the equation of the line with gradient 3 that passes through *S*.

Answer .....[1]

(b) One of the inequalities that defines the shaded region *RST* is $x \leqslant 6$.

Write down the other two inequalities that define this region.

Answer .....

.....[2]

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24 **(a)** $A = \begin{pmatrix} 4 & 3 \\ 1 & 2 \end{pmatrix}$ $B = \begin{pmatrix} 2 & -3 \\ 1 & 1 \end{pmatrix}$

(i) Find $2A - B$.

Answer $\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$ [1]

(ii) Find B^{-1}.

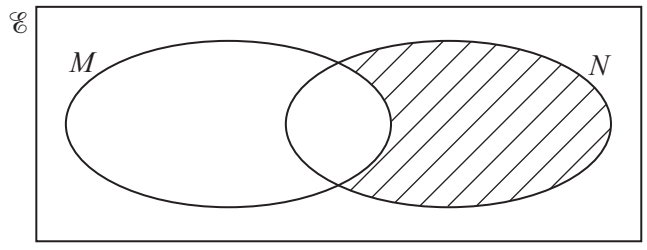
Answer $\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$ [2]

(b) $\mathscr{E}$ = {natural numbers}
P = {factors of 8}
Q = {factors of 12}

List the elements of the set $P \cup Q$.

Answer ..... [2]

(c)



Use set notation to describe the shaded subset in the Venn diagram.

Answer ..... [1]

25 **(a)** Factorise fully $10x^2y + 15xy^2$.

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Answer ..... [1]

(b) Factorise $25a^2 - b^2$.

Answer ..... [1]

(c) Simplify $\dfrac{3}{(x+1)^2} - \dfrac{2}{x+1}$.

Answer ..... [2]

(d) Simplify $\dfrac{3a^2}{10bc} \div \dfrac{9a}{5b^2c}$.

Answer ..... [2]

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