ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER

1 Work out.

(a) $74.6 \times 10 - 3.89 \times 100$

.... [1]

(b) $5 + 3 \times 2 - 1$

.... [1]

2
$$15 \qquad 125 \qquad \sqrt{8} \qquad 11 \qquad \sqrt{25} \qquad 14 \qquad 60$$

From the numbers above, write down

(a) a factor of 70,

.... [1]

(b) a cube number,

.... [1]

(c) an irrational number.

.... [1]

3 (a) Work out $\dfrac{3}{7} + \dfrac{2}{5}$.

.... [1]

(b) Find $\dfrac{2}{3}$ of $\dfrac{6}{11}$, giving your answer as a fraction in its simplest form.

.... [1]

4 **(a)** A record is kept of the water level in a harbour.
One morning, the level is 5 m. That afternoon, the level is −2 m.

Find the difference between the level in the morning and the level in the afternoon.
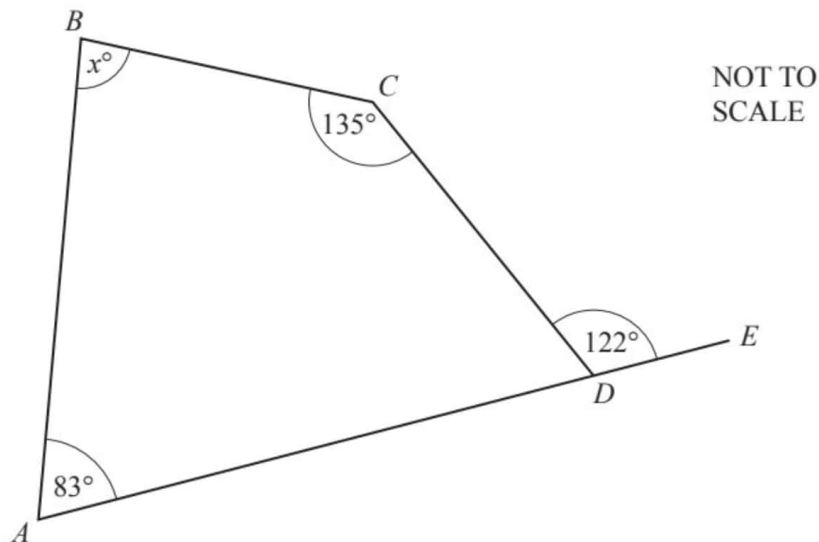
.... m [1]

(b) One day, the temperature at midday is 9 °C.
At midnight the temperature has dropped by 15.3 °C.

Find the temperature at midnight.

.... °C [1]

5

The diagram shows quadrilateral *ABCD* with *AD* extended to *E*.
Angle *BCD* = 135°, angle *BAD* = 83° and angle *CDE* = 122°.

Find the value of *x*.

x = ... [2]

6 (a) Write 308 as a product of its prime factors.

.... [2]

(b) Find the highest common factor (HCF) of 308 and 66.

.... [1]

7
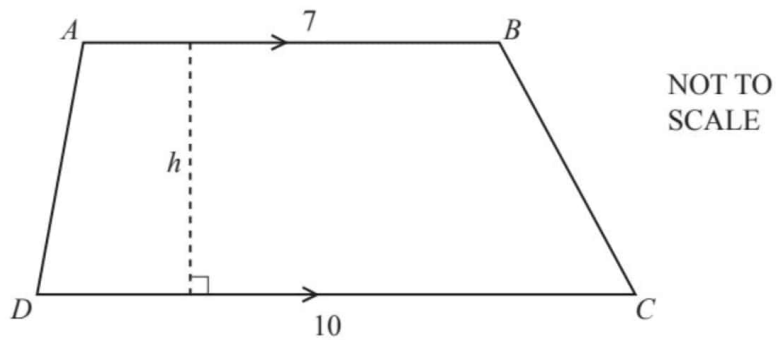
The diagram shows trapezium *ABCD*.
AB = 7 cm and *DC* = 10 cm.
The area of *ABCD* is 85 cm².
The perpendicular height of the trapezium is *h* cm.

Find the value of *h*.

$h =$ .... [2]

8 (a) Simplify $6x + 15 - 2x + 8$.

.... [1]

(b) Expand and simplify $(x-5)^2$.

.... [2]

9 Insert the correct symbol $=$, $>$ or $<$ to make each statement correct.

(a) 0.6 kg .... 60 g [1]

(b) 15 km .... 15 000 m [1]

(c) $4\,m^2$ .... $400\,cm^2$ [1]

10 By writing each number correct to one significant figure, estimate the value of

$$\frac{362.4 - 187.2}{52.3}.$$

.... [2]

11 (a) In a survey, 3 out of every 100 women were taller than 1.9 m.
One of these 100 women is picked at random.

Calculate the probability that she is **not** taller than 1.9 m.

.... [1]

(b) A new housing estate is being planned.
There are three possible plans: A, B and C.
A survey was carried out to see which plan people preferred.
The relative frequency table shows the results.

Plan	A	B	C
Relative frequency	0.3	0.5	0.2

52 people preferred plan C.

(i) Find how many people preferred plan A.

.... [2]

(ii) Calculate the total number of people surveyed.

.... [1]

12 Bernard bought a game in the USA for $15.
Alice bought the same game in Zambia and paid the equivalent price in Zambian kwacha (ZK).

Exchange Rate

1ZK = $0.075

Calculate the price that Alice paid.

....ZK [2]

13 Two numbers x and y are such that
   • $x : y = 5 : 11$
   and
   • $x + y = 112$.

   Find x and y.

   $x = $ ....

   $y = $ .... [2]

14 (a) This is the term-to-term rule for a sequence.

Multiply by 2 and add 3

   The first three terms in this sequence are 1, 5 and 13.

   Write down the next term in this sequence.

   .... [1]

   (b) This is the term-to-term rule for a different sequence.

Square and subtract 5

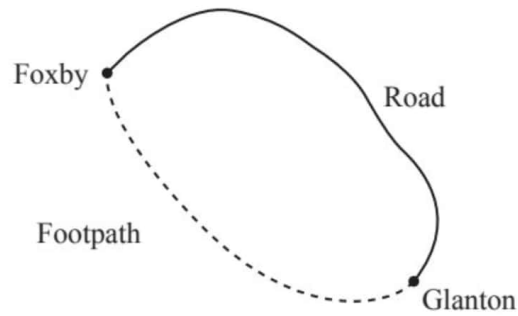   The second and third terms in this sequence are -1 and -4.

   (i) Write down the fourth term in this sequence.

   .... [1]

   (ii) Write down the two possible values for the first term in this sequence.

   .... or .... [2]

15

NOT TO SCALE

Two villages, Foxby and Glanton, are joined by a footpath and a road.

(a) Abdul walks along the footpath from Foxby to Glanton.
He walks for 2 hours 14 minutes and arrives at Glanton at 15 10.

Calculate the time Abdul left Foxby.

.... [1]

(b) The distance, by road, between Foxby and Glanton is 15 km.
A bus travels along the road between Foxby and Glanton.
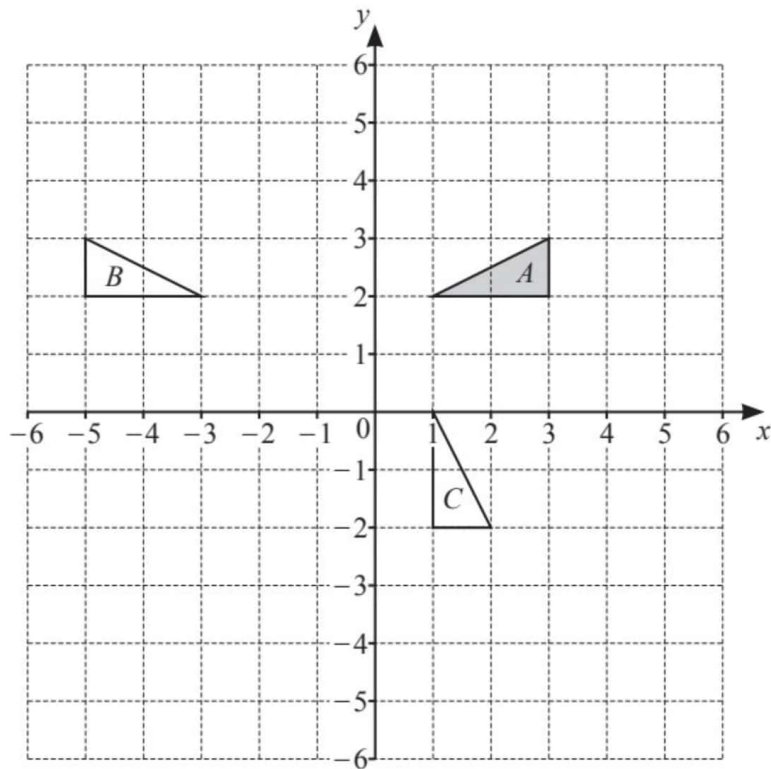The bus journey takes 12 minutes.

Calculate the average speed of the bus in kilometres per hour.

.... km/h [2]

(c) The bearing of Glanton from Foxby is 128°.

Calculate the bearing of Foxby from Glanton.

.... [1]

16

Triangles *A*, *B* and *C* are drawn on the grid.

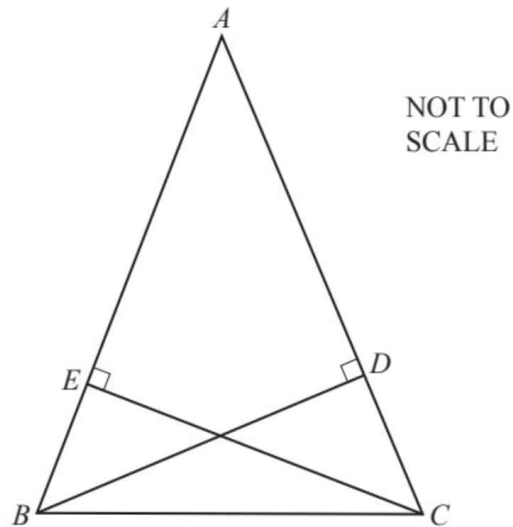**(a)** Describe fully the **single** transformation that maps triangle *A* onto triangle *B*.

....

.... [2]

(b) Describe fully the **single** transformation that maps triangle *A* onto triangle *C*.

....

.... [3]

(c) Triangle *D* is the image of triangle *A* after an enlargement, scale factor 2, with centre of enlargement (1, 2).

Draw triangle *D*. [2]

17

NOT TO
SCALE

The diagram shows an isosceles triangle *ABC* where *AB* = *AC*.
D is a point on *AC* such that angle *ADB* = 90°.
E is a point on *AB* such that angle *AEC* = 90°.

Show that triangles *ADB* and *AEC* are congruent.
Give a reason for each statement you make.

....

....

....

....

.... [3]

18 Solve the simultaneous equations.
Show your working.

$$x + 6y = 0$$
$$3x - 2y = 10$$

$x = $ ....

$y = $ .... [3]

19 y is proportional to $(x-1)^2$.

Given that $y = 18$ when $x = 4$, find y when $x = 6$.

$y = $ .... [2]

20
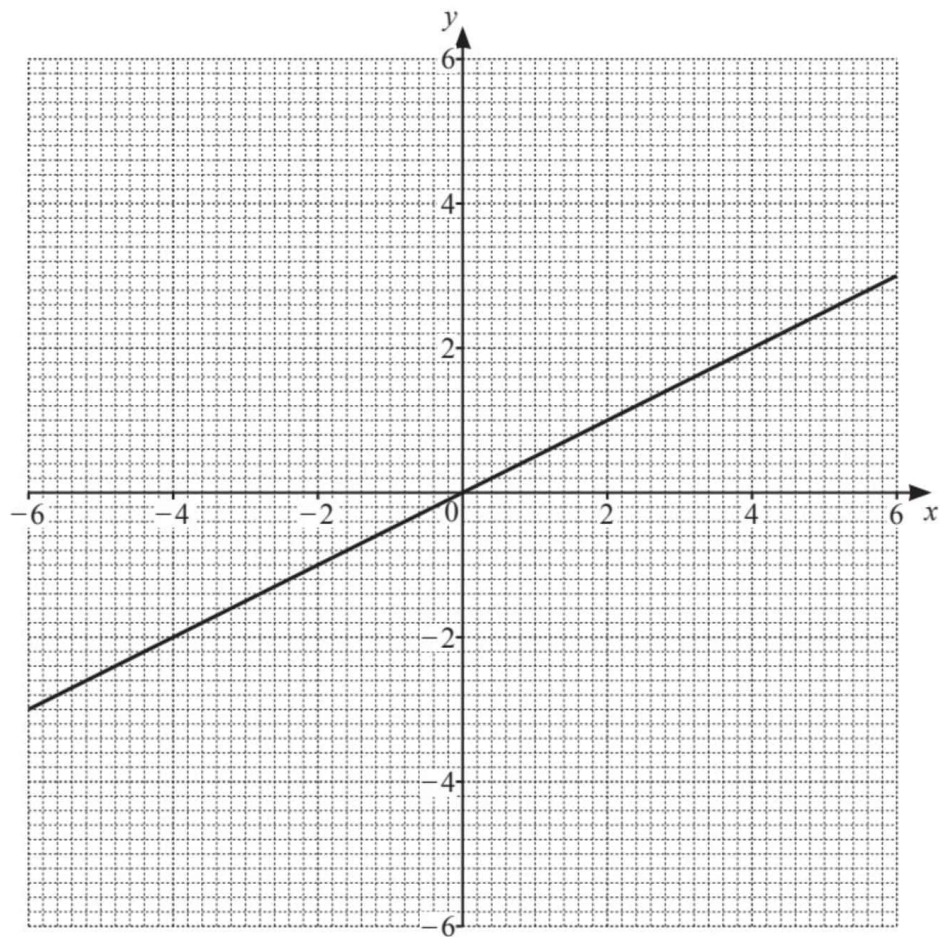
The line $2y = x$ is drawn on the grid.

(a) On the grid, draw the graph of

    (i) $y = 2$,   [1]

    (ii) $y + x = 4$.   [1]

(b) On the grid, shade and label the region **R**, defined by the following inequalities.

    $x + y \leqslant 4$ $2y \geqslant x$ $y \leqslant 2$ $x \geqslant 0$ [2]

21 Factorise.

    (a) $3cx + 2bx - 6cy - 4by$

.... [2]

    (b) $6x^2 + 7x - 10$

.... [2]

22 A car has a mass of 2400 kg, correct to the nearest hundred kilograms.
A caravan has a mass of 1460 kg, correct to the nearest ten kilograms.

Calculate the lower bound for the total mass of the car and caravan.

.... kg [2]

23 (a) $\quad a = \dfrac{b^2 + c}{d}$

      (i) Find a when $b = 4 \times 10^2$, $c = 6 \times 10^3$ and $d = 2 \times 10^2$.
           Write your answer in standard form.

$a =$ .... [3]

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

$b =$ .... [3]

(b) $\quad m \times 10^4 + m \times 10^2 = 36\,360$

    Work out $\quad m \times 10^4 - m \times 10^2$.

.... [2]

24 (a) $\mathbf{M} = \begin{pmatrix} 5 & 1 \\ 2 & 3 \end{pmatrix}$ $\qquad$ $\mathbf{N} = \begin{pmatrix} 4 & -2 \\ 3 & 0 \end{pmatrix}$

Find $\mathbf{M} - \mathbf{N}$.

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

(b) $\mathbf{P} = \begin{pmatrix} 2 & 4 \\ c & -5 \end{pmatrix}$ $\qquad$ $\mathbf{Q} = \begin{pmatrix} 3 & 2 \\ -2 & d \end{pmatrix}$ $\qquad$ $\mathbf{PQ} = \begin{pmatrix} -2 & 0 \\ 19 & 11 \end{pmatrix}$

Find the value of c and the value of d.

$c = $ ....

$d = $ .... [2]

Question 25 is printed on the next page.

25
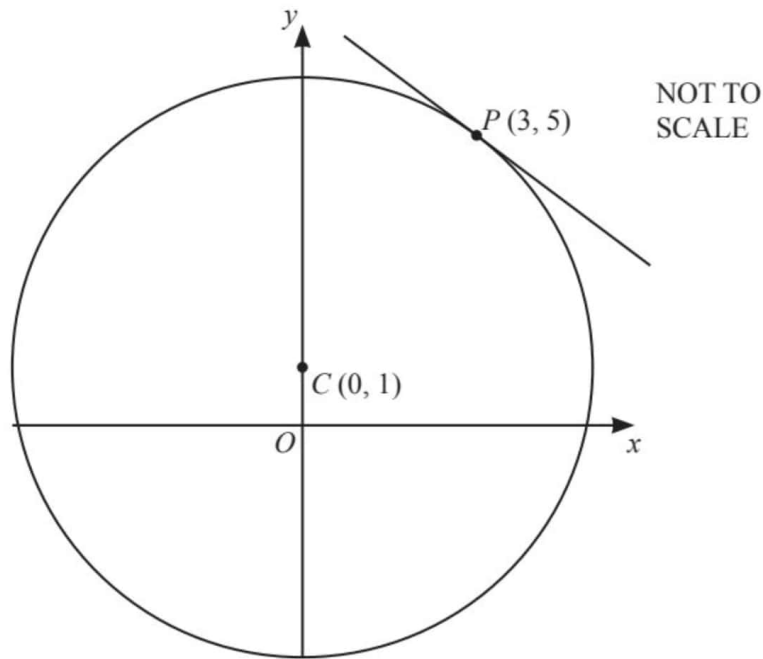
The diagram shows a circle centre C (0, 1).
P (3, 5) is a point on the circumference of the circle.

Find the equation of the tangent at P.

.... [4]