



## 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            125             $\sqrt{8}$             11             $\sqrt{25}$             14            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  $\frac{3}{7} + \frac{2}{5}$ .

..... [1]

(b) Find  $\frac{2}{3}$  of  $\frac{6}{11}$ , 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.

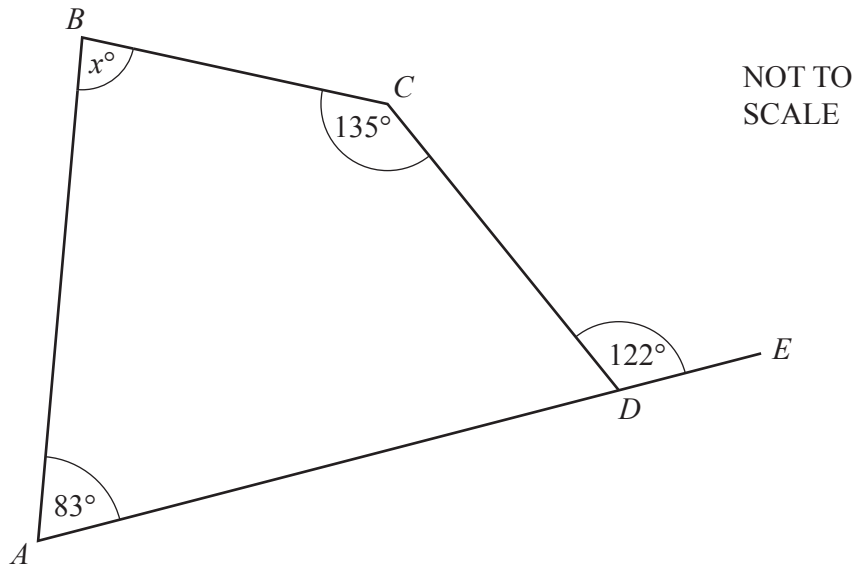
..... m [1]

- (b) One day, the temperature at midday is  $9^{\circ}\text{C}$ .  
At midnight the temperature has dropped by  $15.3^{\circ}\text{C}$ .

Find the temperature at midnight.

.....  $^{\circ}\text{C}$  [1]

5



The diagram shows quadrilateral  $ABCD$  with  $AD$  extended to  $E$ .  
Angle  $BCD = 135^{\circ}$ , angle  $BAD = 83^{\circ}$  and angle  $CDE = 122^{\circ}$ .

Find the value of  $x$ .

$x =$  ..... [2]

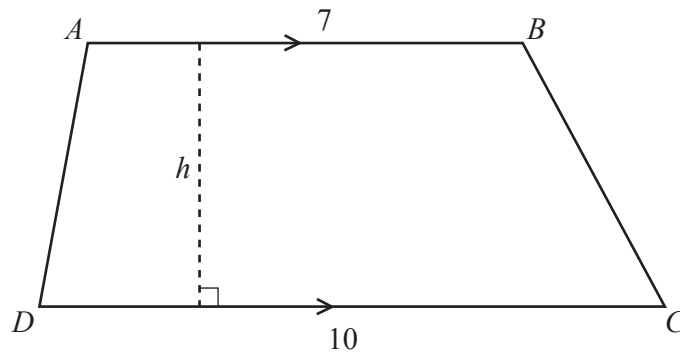
- 6 (a) Write 308 as a product of its prime factors.

..... [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  $85 \text{ cm}^2$ .  
 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)  $0.6 \text{ kg}$  .....  $60 \text{ g}$  [1]

(b)  $15 \text{ km}$  .....  $15\,000 \text{ m}$  [1]

(c)  $4 \text{ m}^2$  .....  $400 \text{ cm}^2$  [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               | <i>A</i> | <i>B</i> | <i>C</i> |
| 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).

|                             |
|-----------------------------|
| <b><u>Exchange Rate</u></b> |
| <b>1ZK = \$0.075</b>        |

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  $y$ .

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots [2]$$

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.

$$\dots\dots\dots [1]$$

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

|                       |
|-----------------------|
| Square and subtract 5 |
|-----------------------|

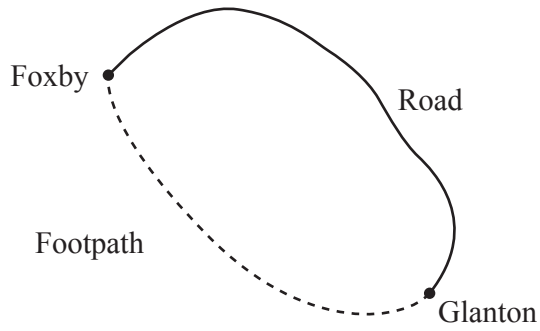
The second and third terms in this sequence are  $-1$  and  $-4$ .

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

$$\dots\dots\dots [1]$$

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

$$\dots\dots\dots \text{ or } \dots\dots\dots [2]$$



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.

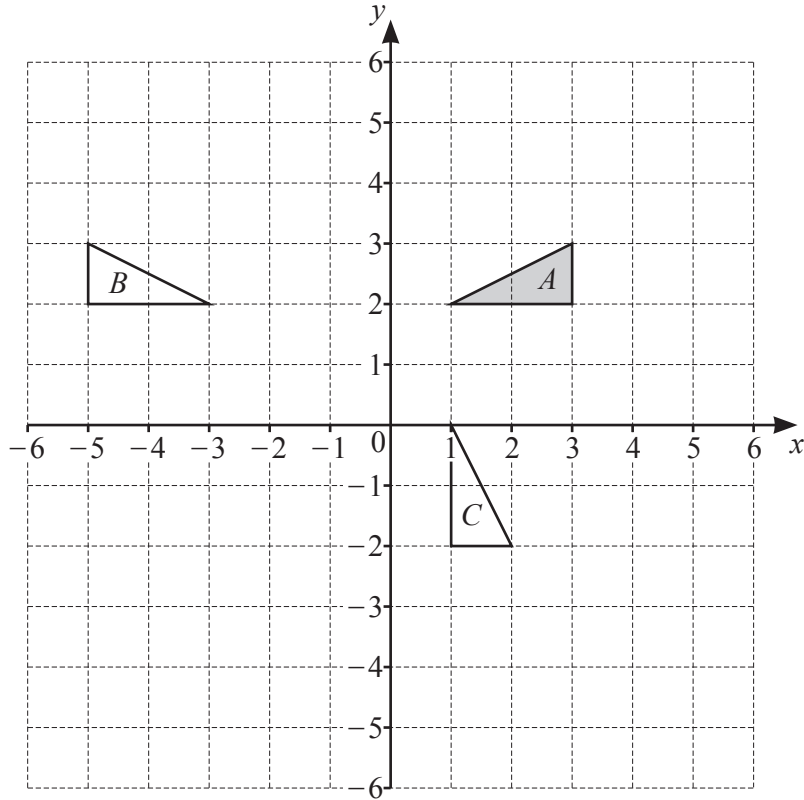
..... km/h [2]

- (c) The bearing of Glanton from Foxby is  $128^\circ$ .

Calculate the bearing of Foxby from Glanton.

..... [1]





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

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

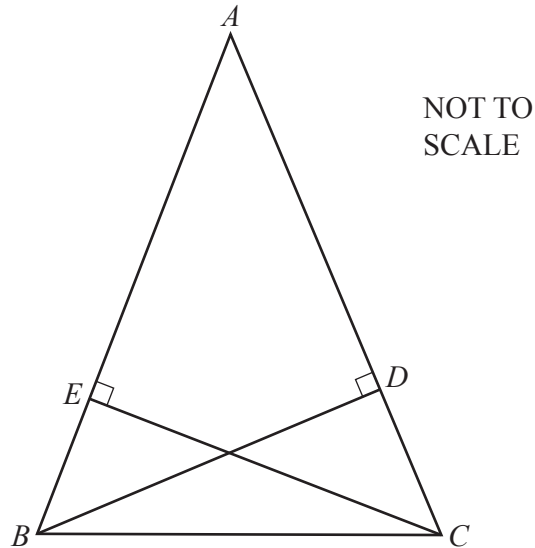
.....  
 ..... [2]

- (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]



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

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.

$$x + 6y = 0$$

$$3x - 2y = 10$$

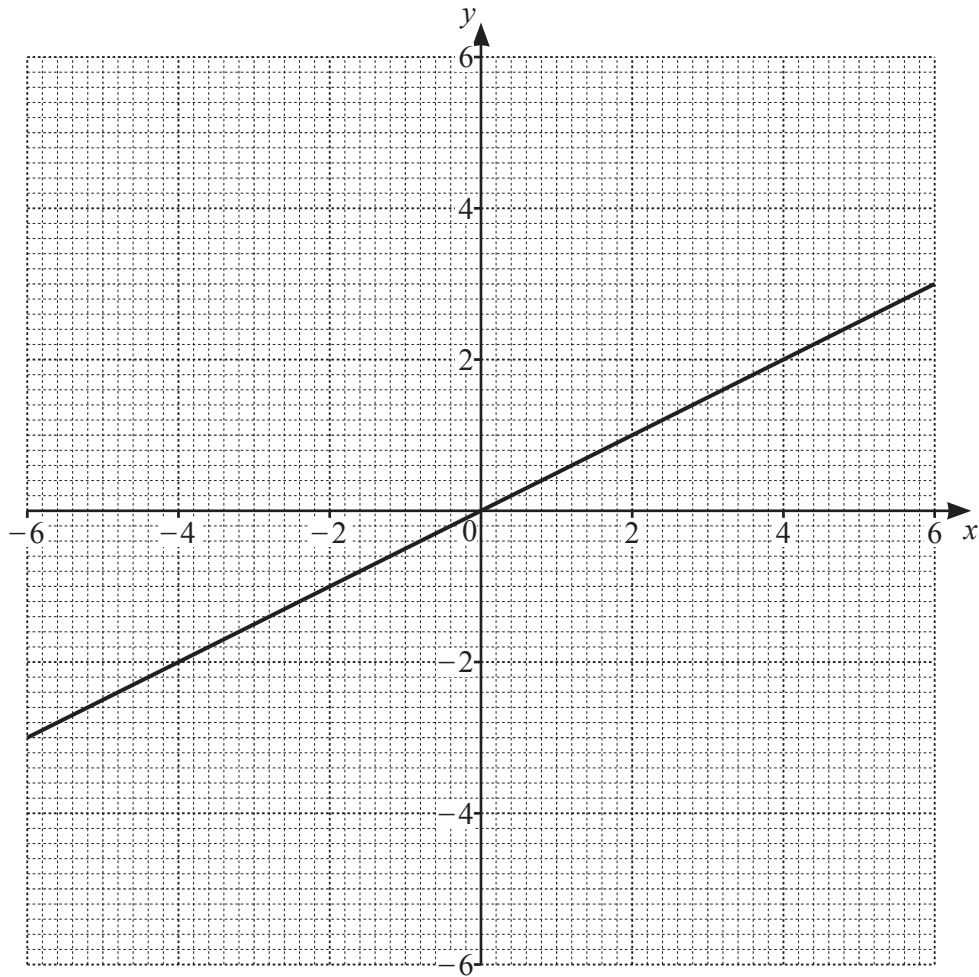
$$x = \dots\dots\dots$$

$$y = \dots\dots\dots [3]$$

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

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

$$y = \dots\dots\dots [2]$$



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.

$$x + y \leq 4 \quad 2y \geq x \quad y \leq 2 \quad x \geq 0$$

[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)  $a = \frac{b^2 + c}{d}$

- (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.

$a = \dots\dots\dots$  [3]

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

$b = \dots\dots\dots$  [3]

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

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

$\dots\dots\dots$  [2]

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

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

$$\left( \begin{array}{cc} & \\ & \end{array} \right) \quad [1]$$

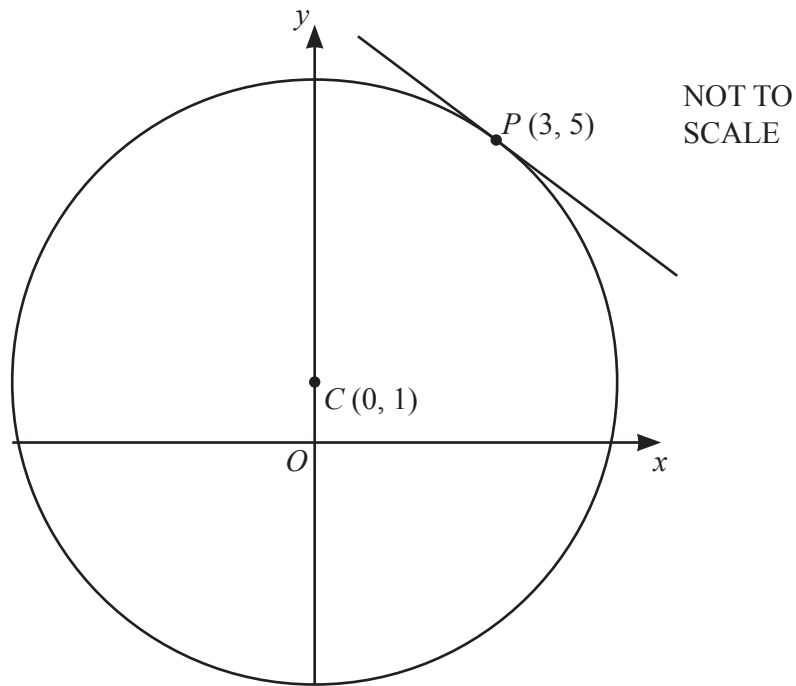
$$(\text{b}) \quad \mathbf{P} = \begin{pmatrix} 2 & 4 \\ c & -5 \end{pmatrix} \quad \mathbf{Q} = \begin{pmatrix} 3 & 2 \\ -2 & d \end{pmatrix} \quad \mathbf{PQ} = \begin{pmatrix} -2 & 0 \\ 19 & 11 \end{pmatrix}$$

Find the value of  $c$  and the value of  $d$ .

$$c = \dots\dots\dots$$

$$d = \dots\dots\dots [2]$$

**Question 25 is printed on the next page.**



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]

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