Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Unit 3: Number, Algebra, Geometry 2 (Calculator)

Higher Tier

Monday 11 November 2013 – Morning
Time: 1 hour 45 minutes

Paper Reference
5MB3H/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P43612A

6/5/4/4/

P 4 3 6 1 2 A 0 1 2 0

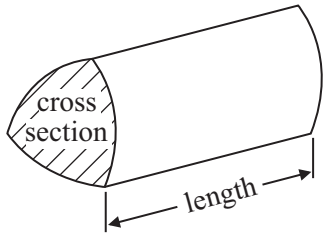
PEARSON

GCSE Mathematics 2MB01

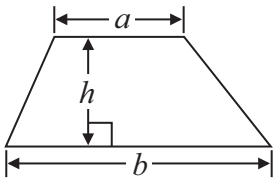
Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of prism = area of cross section × length

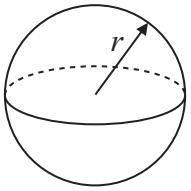


Area of trapezium = $\frac{1}{2}(a + b)h$



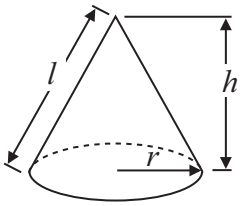
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

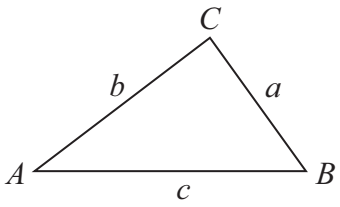


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



In any triangle *ABC*



The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

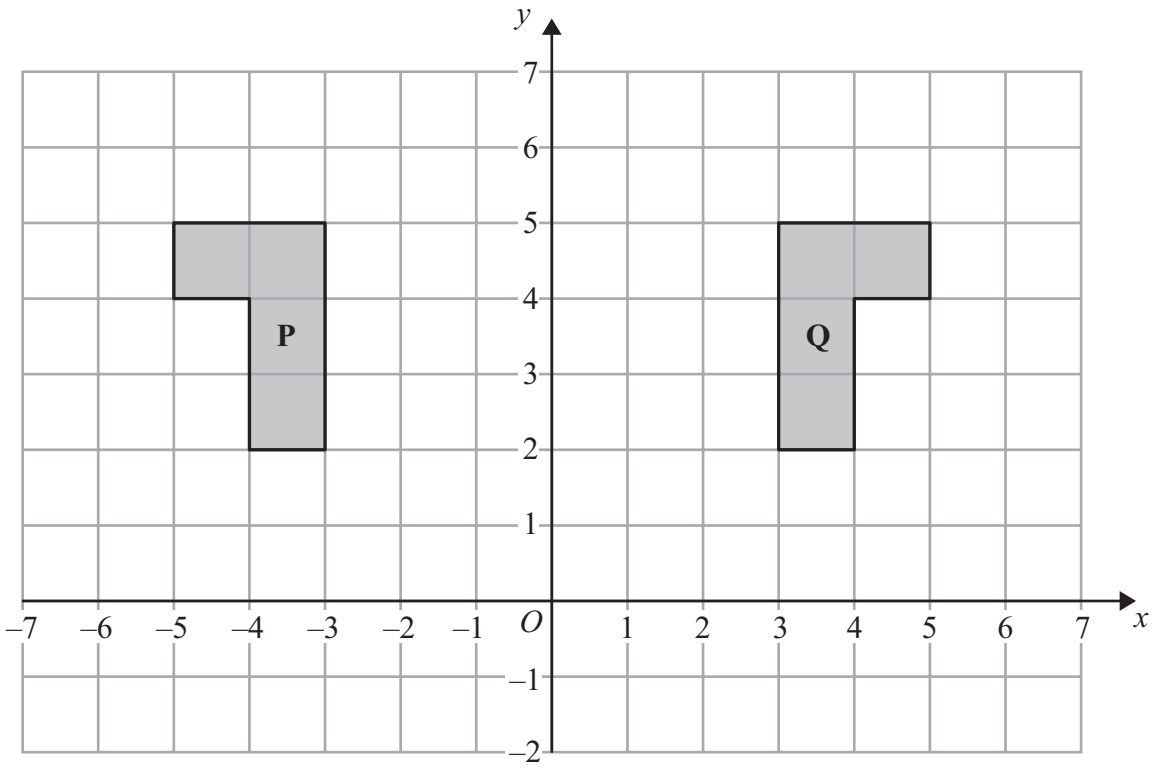
Area of triangle = $\frac{1}{2}ab \sin C$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Two shapes are shown on the grid.



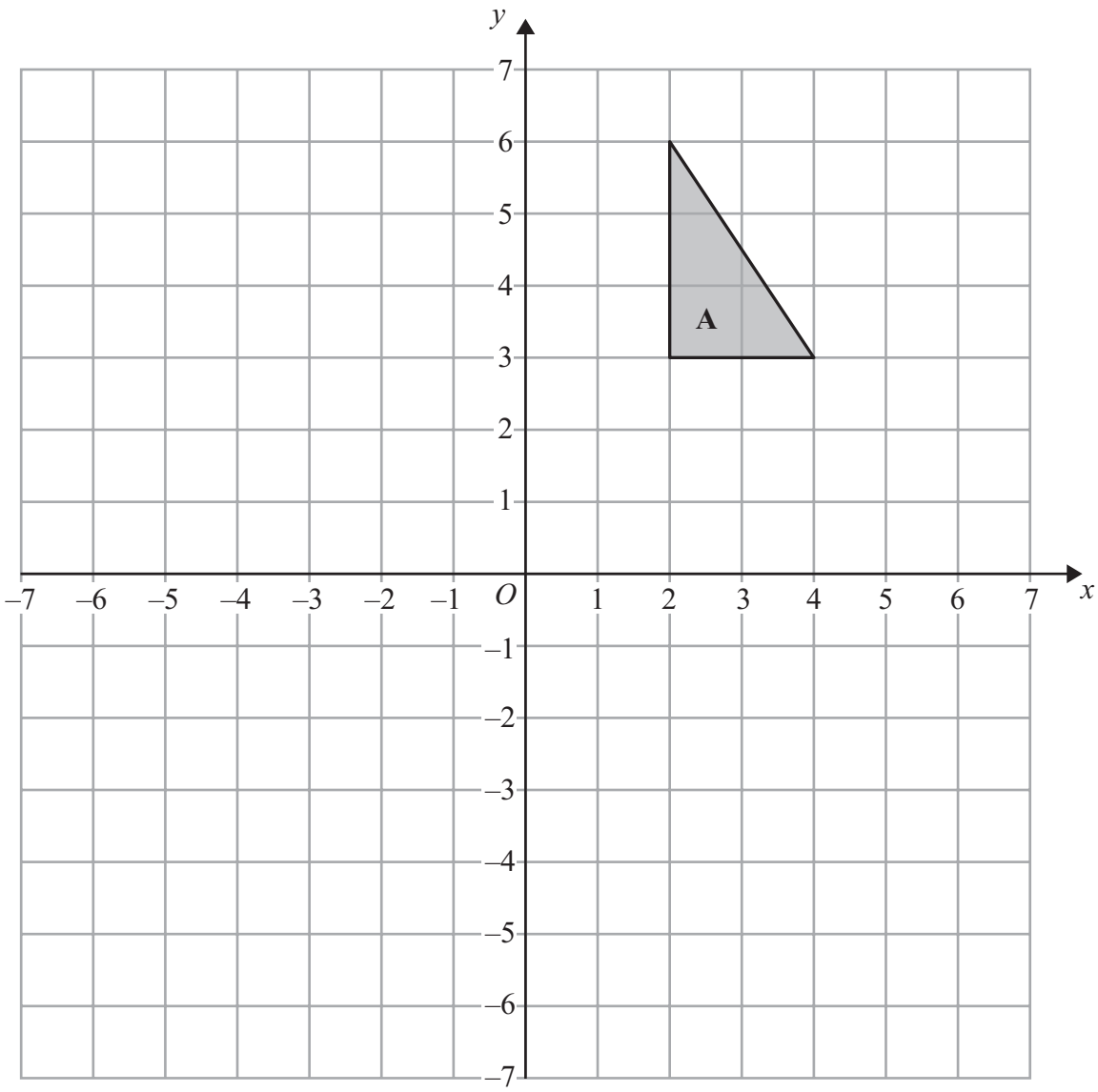
(a) Describe fully the single transformation that maps shape **P** onto shape **Q**.

.....

.....

.....

(2)



(b) Rotate triangle **A** 90° clockwise about the point (0, 2).
Label the new triangle **B**.

(2)

(Total for Question 1 is 4 marks)

2 One day a supermarket has 8420 customers.

65% of the customers pay with a debit card.

$\frac{1}{5}$ of the customers pay with a credit card.

The rest of the customers pay with cash.

Work out how many customers pay with cash.

.....

(Total for Question 2 is 4 marks)

3 The equation $x^3 + 4x = 60$ has a solution between 3 and 4

Use a trial and improvement method to find this solution.
Give your answer correct to one decimal place.
You must show **all** your working.

$x =$ .....

(Total for Question 3 is 4 marks)

4 Lewis has a copper pipe with a length of 150 cm and a mass of 800 grams.

He cuts a piece of the copper pipe with a length of 90 cm.

Work out the mass of this piece of copper pipe.

..... grams

(Total for Question 4 is 2 marks)

***5** Vicky makes 8 purses and 9 key rings to sell for charity.
The price of a purse will be twice as much as the price of a key ring.

Vicky wants to get a total of exactly £40 when she sells all the purses and all the key rings.

Work out the price Vicky needs to charge for each purse and for each key ring.

(Total for Question 5 is 4 marks)

6 Mrs Evans is planning a trip to the zoo.

She finds out this information.

July

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Off peak Peak

Ticket Prices

	Peak	Off peak
Adult	£20.50	£19.50
Child	£15.50	£15.00
Senior citizen	£19	£18

Family Offer

10% Discount	2 adults and 2 children or 1 adult and 3 children

Mrs Evans will go to the zoo on Friday 17th July.
She will need to buy tickets for 1 adult and 3 children.

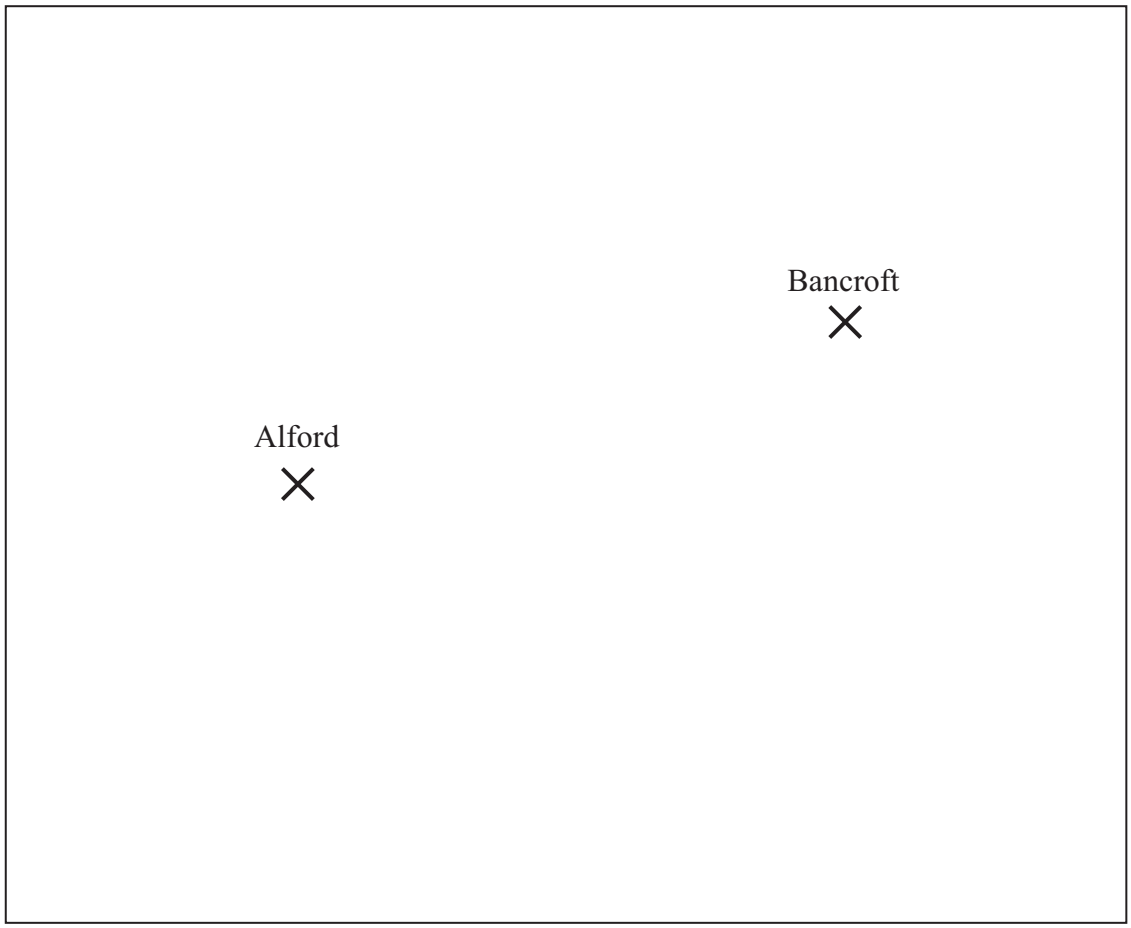
Mrs Evans wants to buy the tickets as cheaply as possible.

Work out the total cost of the tickets.

£ .....

(Total for Question 6 is 4 marks)

7 The map shows the positions of two schools, Alford and Bancroft.



Scale 1 cm represents 1 km

A new school is going to be built.

The new school will be less than 5 kilometres from Alford.
It will be nearer to Bancroft than to Alford.

Shade the region on the map where the new school can be built.

(Total for Question 7 is 3 marks)

***8** A shop sells toothpaste in 3 different sizes of tube.

A 70 m*l* tube of toothpaste costs £1.79
A 100 m*l* tube of toothpaste costs £2.75
A 150 m*l* tube of toothpaste costs £3.99

Which size of tube is the best value for money?
You must show all your working.

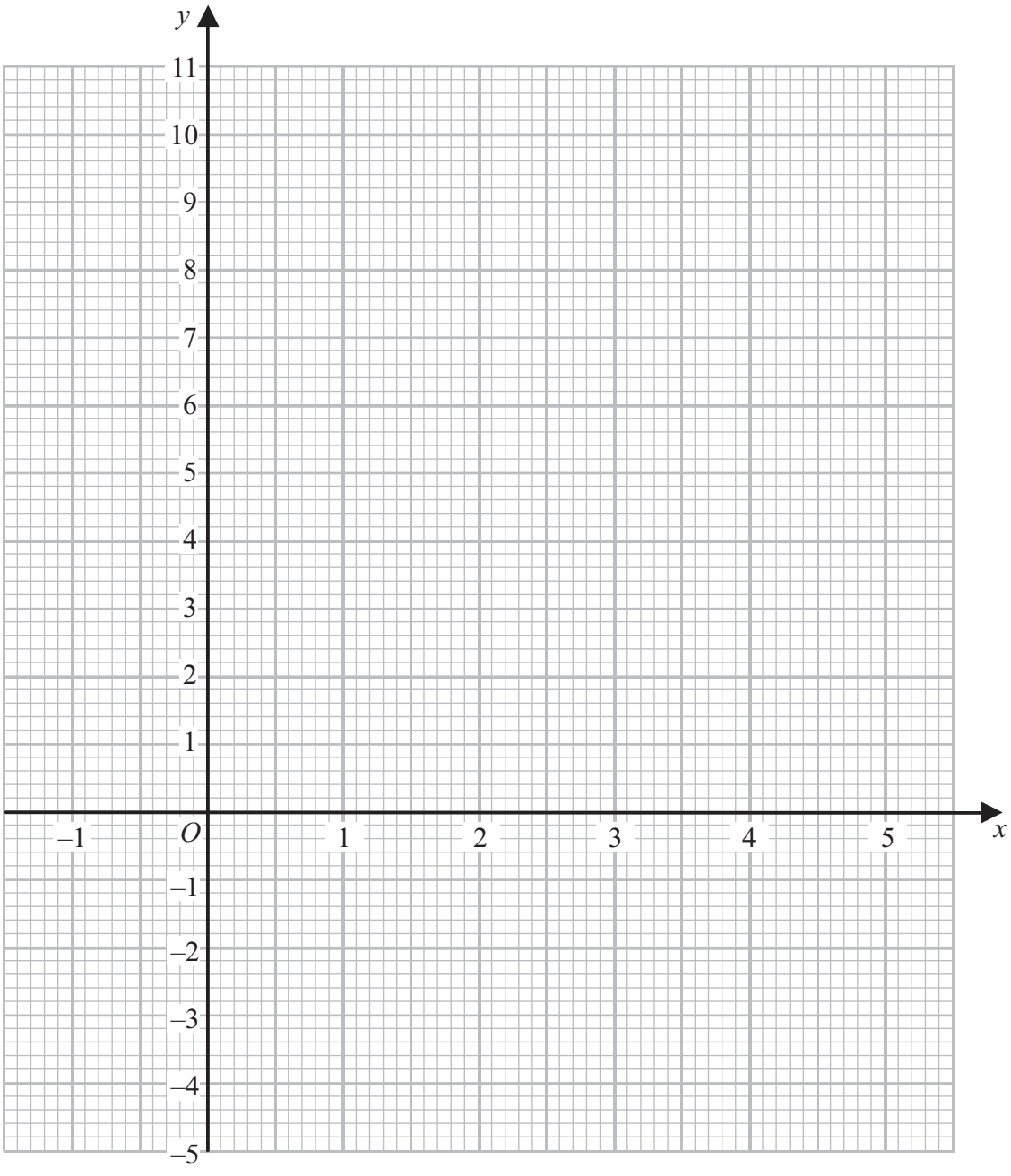
(Total for Question 8 is 4 marks)

9 (a) Complete the table of values for $y = x^2 - 5x + 3$

x	–1	0	1	2	3	4	5
y		3	–1		–3		3

(2)

(b) On the grid below, draw the graph of $y = x^2 - 5x + 3$ for values of x from $x = -1$ to $x = 5$



(2)

(c) Find estimates of the solutions of the equation $x^2 - 5x + 3 = 0$

$x =$ .....

or $x =$ .....

(2)

(Total for Question 9 is 6 marks)

10 (a) Solve $4(y - 7) = 13$

$y =$ .....

(2)

(b) Make t the subject of the formula $P = 4t - 3$

.....

(2)

(Total for Question 10 is 4 marks)

11

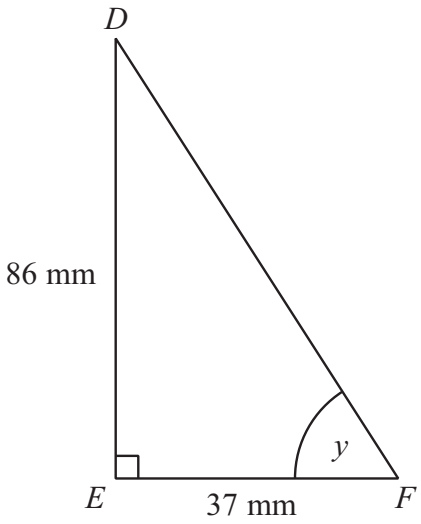


Diagram **NOT** accurately drawn

DEF is a right-angled triangle.
DE = 86 mm
EF = 37 mm

Calculate the size of the angle marked *y*.
Give your answer correct to 1 decimal place.

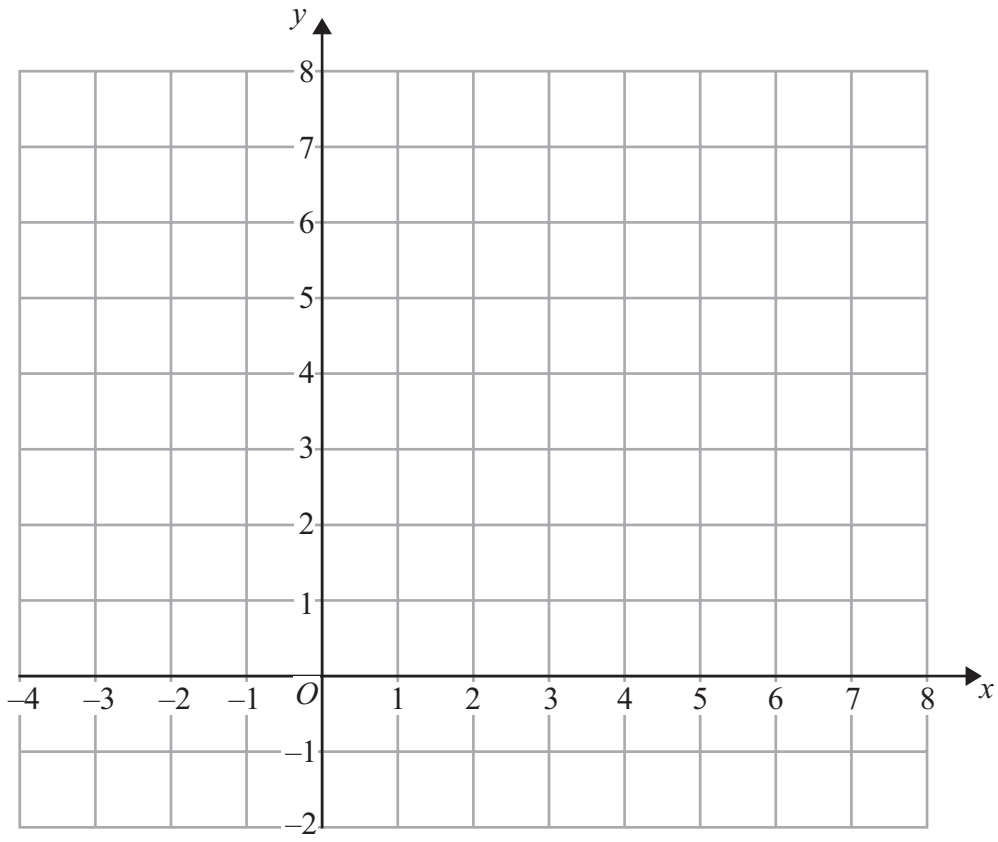
.....°

(Total for Question 11 is 3 marks)

12 On the grid below, show by shading, the region defined by the inequalities

$x + y < 6$ $x > -1$ $y > 2$

Mark this region with the letter R.



(Total for Question 12 is 4 marks)

13 *ABC* is a triangle.

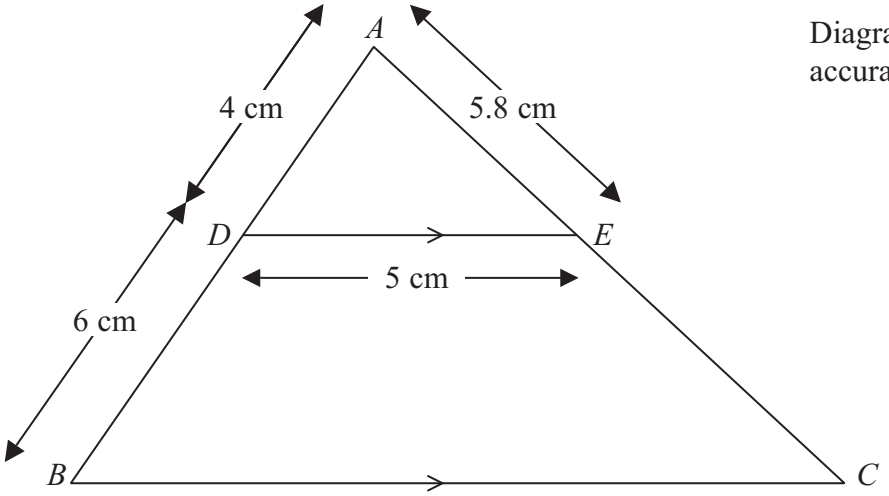


Diagram **NOT** accurately drawn

D is a point on *AB* and *E* is a point on *AC*.
DE is parallel to *BC*.
AD = 4 cm, *DB* = 6 cm, *DE* = 5 cm, *AE* = 5.8 cm.

Calculate the perimeter of the trapezium *DBCE*.

.....cm

(Total for Question 13 is 4 marks)

14 Solve the simultaneous equations

$$4x - 5y = 33$$
$$3x + y = 1$$

$x =$ .....

$y =$ .....

(Total for Question 14 is 3 marks)

15 (a) (i) Use your calculator to work out $\dfrac{\sqrt{46.2 - 17.5}}{2.39 \times 0.7}$

Write down all the figures on your calculator display.

.....

(ii) Give your answer to (i) correct to 3 significant figures.

.....

(3)

(b) Work out $(2.34 \times 10^5) \times (5 \times 10^4)$
Give your answer in standard form.

.....

(2)

(Total for Question 15 is 5 marks)

16 Jane has a flower bed in the shape of an equilateral triangle.
The perimeter of the flower bed is 15 metres.

(a) Work out the area of the flower bed.
Give your answer correct to 1 decimal place.

.....m^2

(3)

Jane has some containers in the shape of hemispheres with diameter 35 cm.

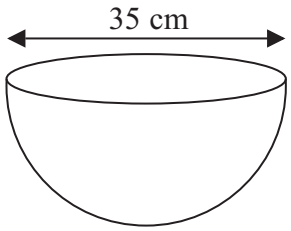


Diagram **NOT** accurately drawn

Jane is going to fill the containers completely with compost.
She has 80 litres of compost.
1 litre = 1000 cm^3.

(b) Work out how many containers Jane can fill completely with compost.

.....

(4)

(Total for Question 16 is 7 marks)

17 Make x the subject of the formula $y = \dfrac{x^2 + 9}{x^2 - 7}$

.....

(Total for Question 17 is 4 marks)

***18**

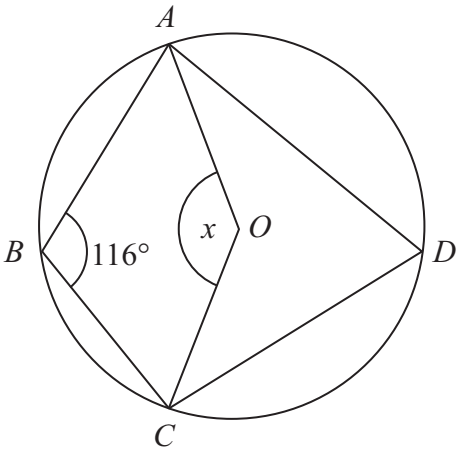


Diagram **NOT** accurately drawn

A, *B*, *C* and *D* are points on the circumference of a circle with centre *O*.
Angle *ABC* = 116°

Find the size of the angle marked *x*.
Give reasons for your answer.

(Total for Question 18 is 4 marks)

19

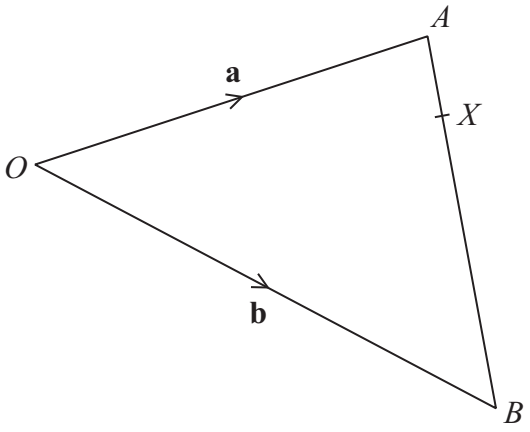


Diagram **NOT** accurately drawn

OAB is a triangle.

$\overrightarrow{OA} = \mathbf{a}$

$\overrightarrow{OB} = \mathbf{b}$

(a) Write down the vector $\overrightarrow{AB}$ in terms of **a** and **b**.

.....

(1)

X is the point on AB such that $AX : XB = 1 : 4$

(b) Express the vector $\overrightarrow{OX}$ in terms of **a** and **b**.

$\overrightarrow{OX} =$ .....

(3)

(Total for Question 19 is 4 marks)

Turn over for Question 20

20 Solve, by factorising, the equation $8x^2 - 30x - 27 = 0$

.....

(Total for Question 20 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS