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

Tuesday 10 November 2015 – 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 ▶

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P 4 5 9 0 8 A 0 1 2 4

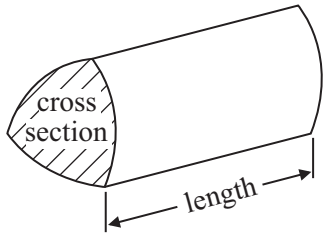
PEARSON

GCSE Mathematics 2MB01

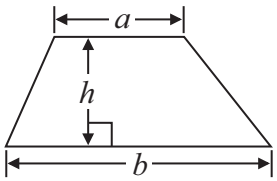
Formulae: Higher Tier

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

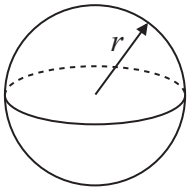


Area of trapezium = $\frac{1}{2}(a + b)h$



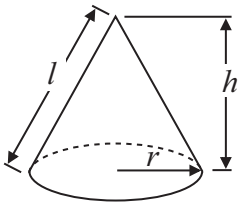
Volume of sphere = $\frac{4}{3}\pi r^3$

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

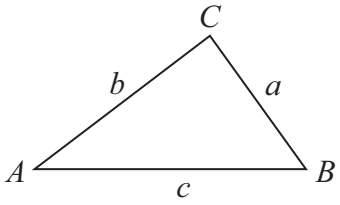


Volume of cone = $\frac{1}{3}\pi r^2 h$

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 (a) Work out the value of $\dfrac{4.5 + \sqrt{10}}{3.1}$

Give your answer correct to 2 decimal places.

.....

(2)

(b) Work out the value of

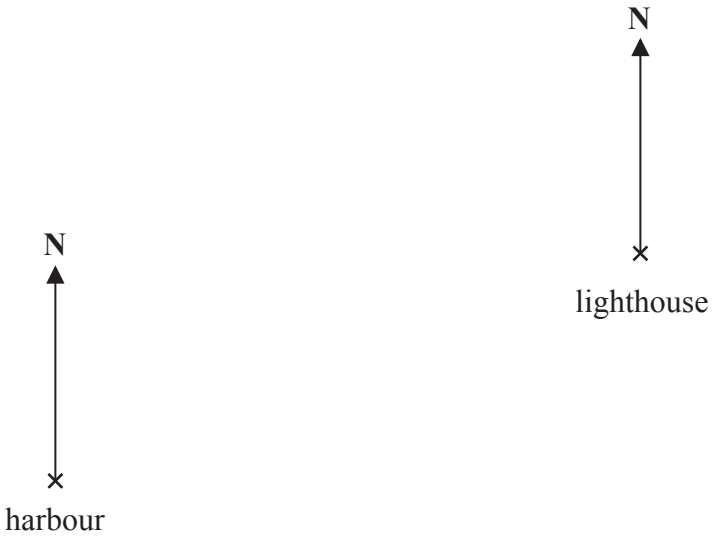
$$\frac{1}{2.5 \times 10^{-3}}$$

.....

(1)

(Total for Question 1 is 3 marks)

2 The diagram shows the positions of a lighthouse and a harbour on a map.



A boat is on a bearing of

300° from the lighthouse
040° from the harbour.

(a) On the diagram, mark with a cross (×) the position of the boat.
Label the boat *B*.

(3)

The scale of the map is 1 cm represents 50 000 cm.

(b) Work out the real distance from the harbour to the lighthouse.
Give your answer in km.

.....km

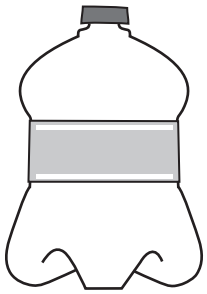
(2)

(Total for Question 2 is 5 marks)

***3** A supermarket has two special offers on lemonade.

Bottles of lemonade

Special offer



15% off the normal price of each bottle

Cans of lemonade

Special offer

Buy 3 cans get 25p off the total cost

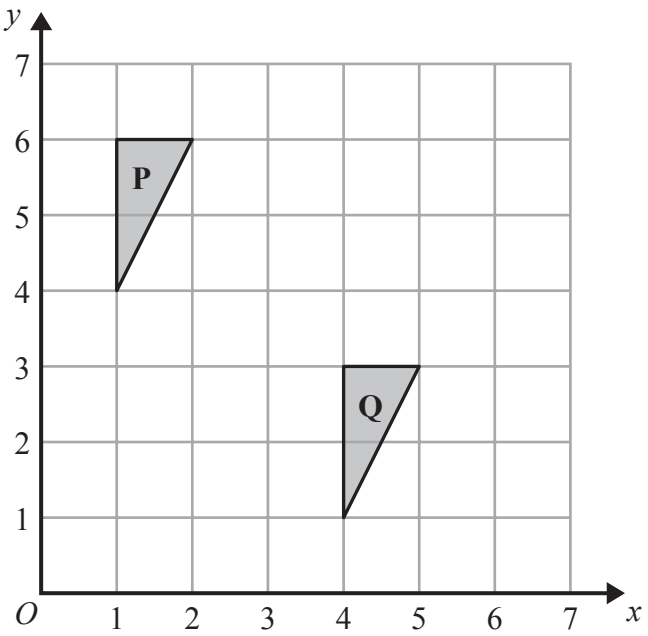
The normal price of a 2.5 litre bottle of lemonade is £1.60
The normal price of a 0.33 litre can of lemonade is 28p.

Jerry is going to buy 4 bottles of the lemonade on special offer or 30 cans of the lemonade on special offer.

Which special offer is the better value for money?

(Total for Question 3 is 5 marks)

4

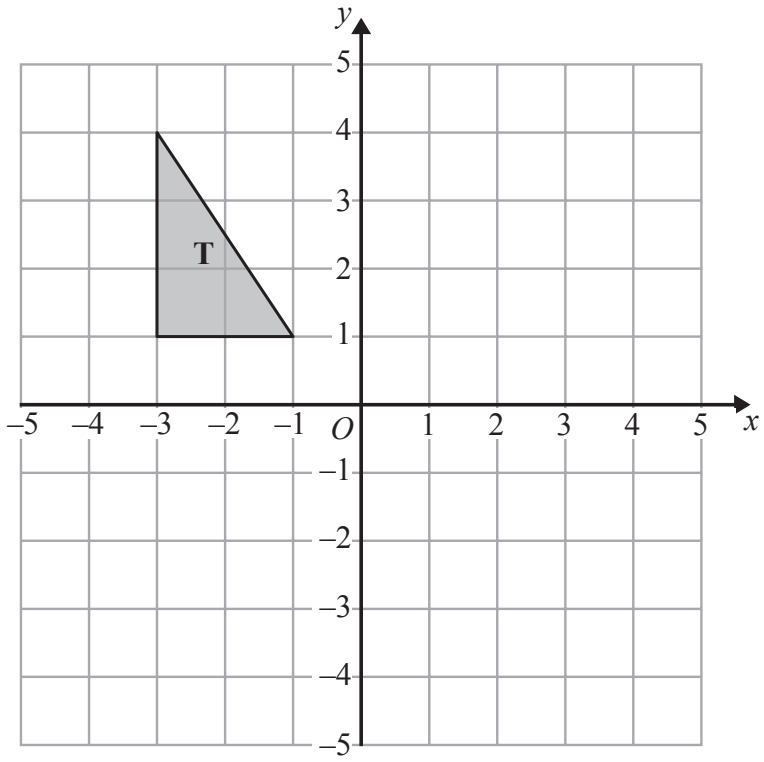


(a) Describe fully the single transformation that maps shape **P** to shape **Q**.

.....

.....

(2)



(b) Rotate triangle **T** 180° about the point (0, 1).

(2)

(Total for Question 4 is 4 marks)

5 Harry has a cable.
The cable has a length of 16 metres.

Harry cuts the cable into two parts, part *A* and part *B*.

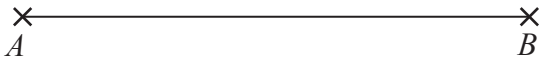
The length of part *A* is 5 metres.
The weight of part *A* is 8 kg.

Work out the weight of part *B*.

.....kg

(Total for Question 5 is 3 marks)

6



Use ruler and compasses to **construct** the perpendicular bisector of the line AB.
You must show all your construction lines.

(Total for Question 6 is 2 marks)

7 The equation $x^3 - 9x = 48$
has a solution between 4 and 5

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

$x =$ .....

(Total for Question 7 is 4 marks)

8 The diagram shows a prism.

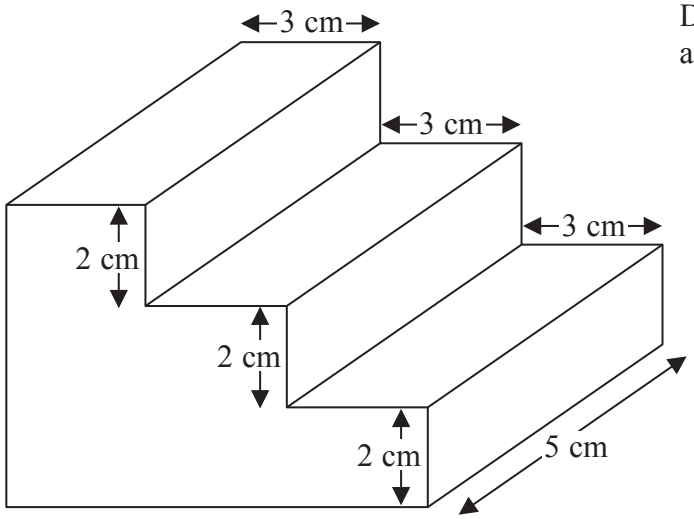


Diagram **NOT** accurately drawn

All the corners are right angles.

Work out the volume of the prism.

..... cm^3

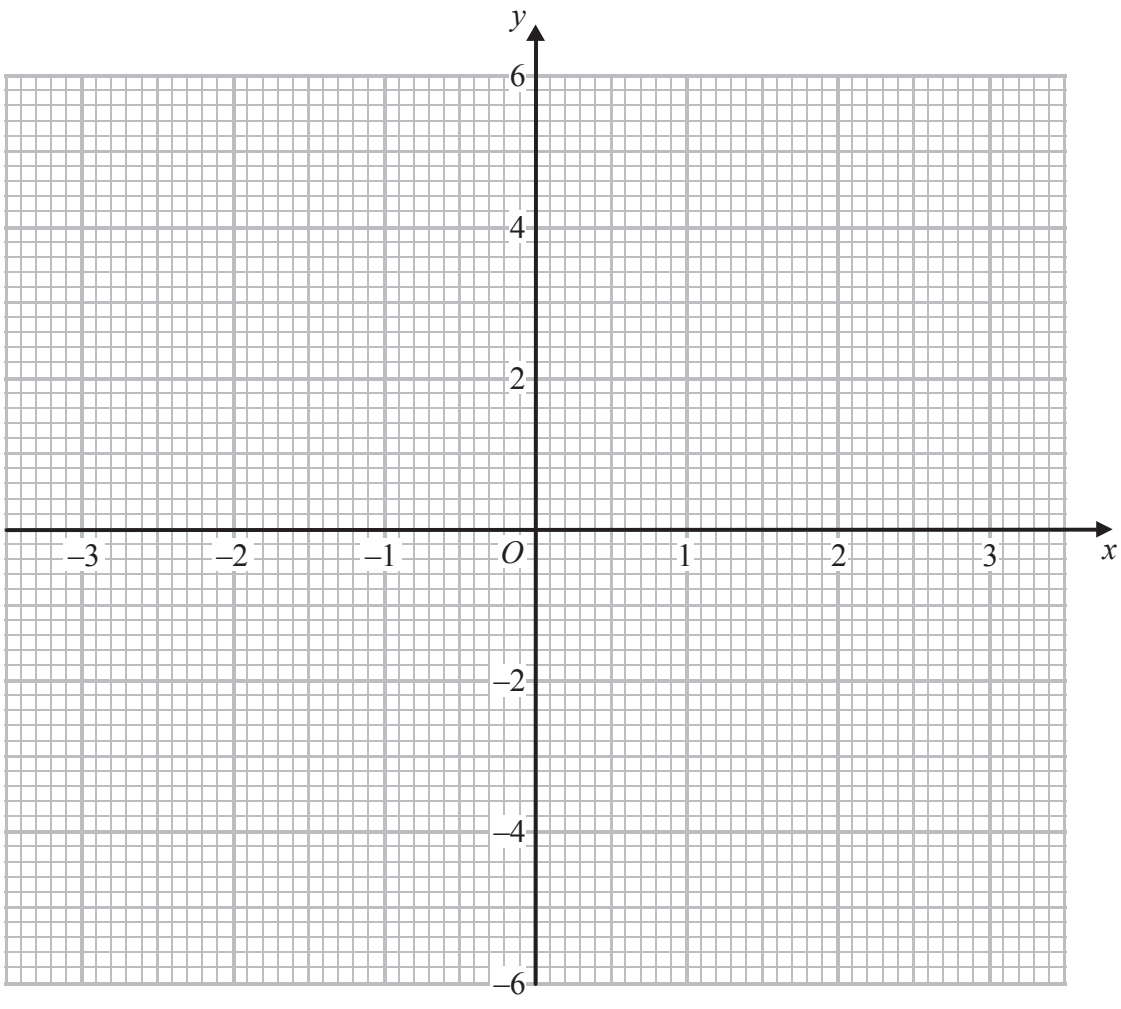
(Total for Question 8 is 3 marks)

9 (a) Complete the table of values for $y = 4 - x^2$

x	−3	−2	−1	0	1	2	3
y	−5		3			0	

(2)

(b) On the grid, draw the graph of $y = 4 - x^2$ for values of x from –3 to 3



(2)

(Total for Question 9 is 4 marks)

10 Hilary, Imogen and Jeeha are playing a game with cards.

Imogen has 3 cards more than Hilary.
Jeeha has twice as many cards as Imogen.

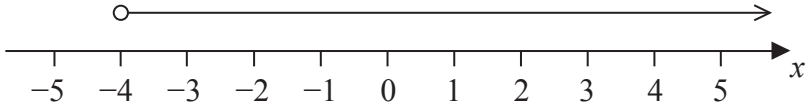
They have a total of 53 cards.

Work out how many cards Hilary has.

.....

(Total for Question 10 is 4 marks)

11



(a) Write down the inequality represented on the number line.

.....

(1)

(b) Solve $4y - 9 \leqslant 3$

.....

(2)

(c) $-3 \leqslant n < 2$

$-2 < m < 4$

n and m are integers.

Given that $n = m$, write down all the possible values of n.

.....

(2)

(Total for Question 11 is 5 marks)

12 Jade makes an orange drink by mixing orange concentrate with water.

She mixes 15 cm^3 of orange concentrate with 250 cm^3 of water.

The density of orange concentrate is 1.20 g/cm^3.
The density of water is 1.00 g/cm^3.

Work out the density of Jade's orange drink.
Give your answer correct to 2 decimal places.

..... g/cm^3

(Total for Question 12 is 3 marks)

***13** The value of a motor bike depreciates by 20% each year.

Brian says,

"After two years, the value of the motor bike will have reduced by 40%".

He is **wrong**.

Explain why.

(Total for Question 13 is 3 marks)

14 Make t the subject of the formula

$$p = \sqrt{\frac{3t}{a}}$$

.....

(Total for Question 14 is 3 marks)

15 The diagram shows a pond.

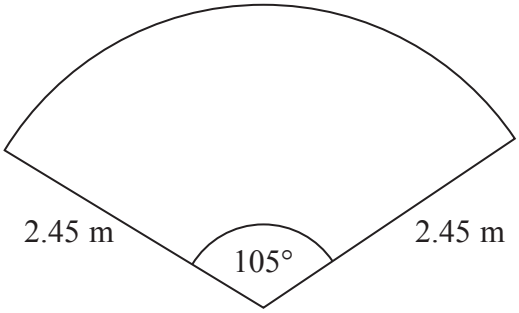


Diagram **NOT** accurately drawn

The pond is in the shape of a sector of a circle.

Toby is going to put edging on the perimeter of the pond.

Edging is sold in lengths of 1.75 metres.
Each length of edging costs £3.49

Work out the total cost of edging Toby needs to buy.

£ .....

(Total for Question 15 is 5 marks)

16 Solve $\frac{x+1}{2} + \frac{2x-1}{3} = \frac{5}{6}$

$x =$ .....

(Total for Question 16 is 4 marks)

***17**

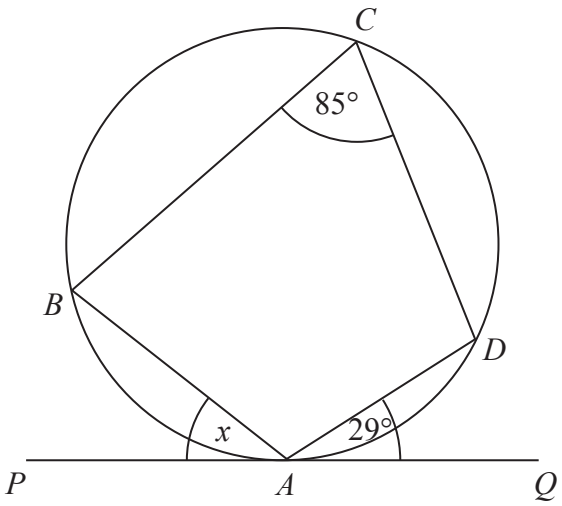


Diagram **NOT** accurately drawn

In the diagram,

the points A, B, C and D are on the circumference of a circle
the line PAQ is a tangent to the circle
angle $DAQ = 29°$
angle $BCD = 85°$

Work out the size of the angle marked x.
Give a reason for each stage of your working.

(Total for Question 17 is 3 marks)

18 Solve $6x^2 - x - 15 = 0$

.....

(Total for Question 18 is 3 marks)

19 y is proportional to x^2.

When $x = 5$, $y = 100$

Work out the value of y when $x = 3$

$y =$ .....

(Total for Question 19 is 3 marks)

20 $I = \dfrac{V}{R}$

$V = 250$ correct to the nearest 5

$R = 3900$ correct to the nearest 100

Work out the lower bound for the value of I.
Give your answer correct to 3 decimal places.
You must show your working.

.....

(Total for Question 20 is 3 marks)

21

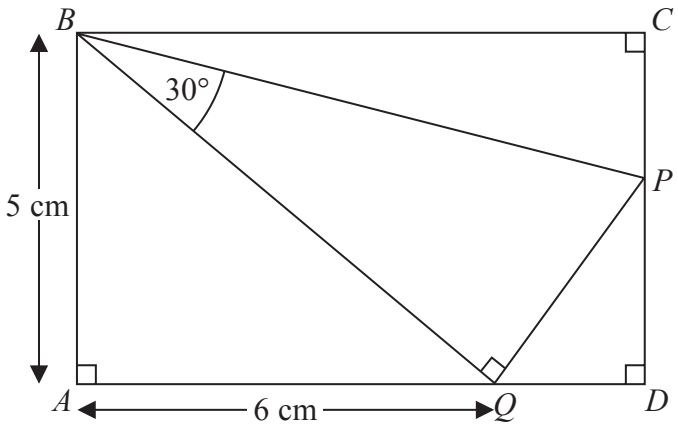


Diagram **NOT** accurately drawn

In the diagram,

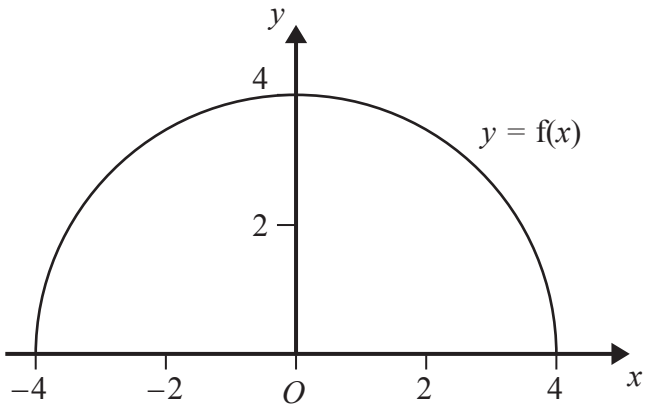
ABCD is a rectangle
P lies on the line *CD*
Q lies on the line *AD*
PQB is a right-angled triangle

Work out the length of *BC*.
Give your answer correct to 3 significant figures.
You must show your working.

.....cm

(Total for Question 21 is 5 marks)

22 Here is the graph of $y = f(x)$.



(a) Write down the coordinates of the point where the graph of $y = f(x) - 3$ meets the y-axis.

(..... , ...)

(1)

The graph of $y = f(4x)$ meets the x-axis at the points P and Q.

(b) Work out the length of the line segment PQ.

.....

(2)

(Total for Question 22 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS