Write your name here

Surname	Other names

Edexcel GCSE

Centre Number	Candidate Number

Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Higher Tier

Tuesday 13 November 2012 – Morning
Time: 1 hour 45 minutes

Paper Reference
5MM2H/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 100
- 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 ▶

P40679A

6/6/7/3/

P 4 0 6 7 9 A 0 1 2 4

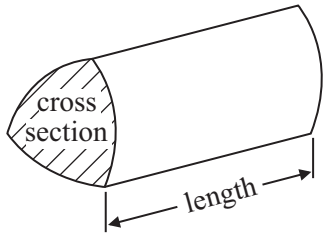
PEARSON

GCSE Mathematics 2MM01

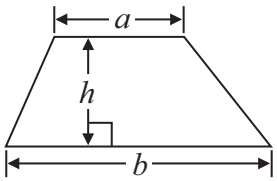
Formulae: Higher Tier

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

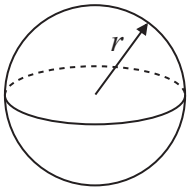


Area of trapezium = $\frac{1}{2}(a + b)h$



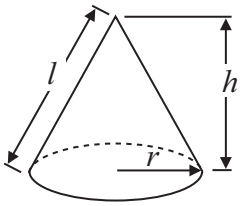
Volume of sphere = $\frac{4}{3}\pi r^3$

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

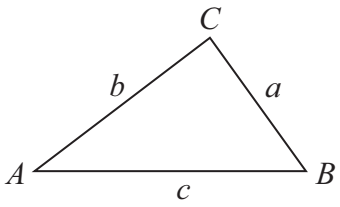


Volume of cone = $\frac{1}{3}\pi r^2 h$

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 5 pencils cost £1.85

Work out the cost of 9 of these pencils.

£.....

(Total for Question 1 is 2 marks)

2 Use your calculator to work out the value of $\dfrac{3.89 \times 3.4}{7.463 - 2.85}$

Write down all the figures on your calculator display.

.....

(Total for Question 2 is 2 marks)

3 There are 30 buttons in a box.
12 of the buttons are black.
The rest of the buttons are white.

(a) Write down the ratio of the number of black buttons to the number of white buttons.
Give your ratio in its simplest form.

.....

(2)

James takes some black buttons from the box.
The ratio of the number of black buttons in the box to the number of white buttons in the box is now 1 : 2

(b) How many black buttons did James take from the box?

.....

(3)

(Total for Question 3 is 5 marks)

***4**

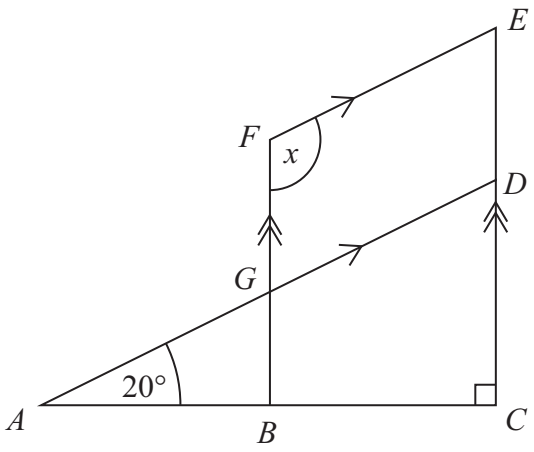


Diagram **NOT** accurately drawn

ABC is a straight line.
BGF is parallel to *CDE*.
AGD is parallel to *FE*.

Angle *CAD* = 20°
Angle *ACD* = 90°

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

(Total for Question 4 is 4 marks)

5 A solid cube has a surface area of 150 cm^2.

Work out the volume of the cube.

.....cm^3

(Total for Question 5 is 3 marks)

***6** A regular 5-sided polygon does **not** tessellate.

Explain why.

(Total for Question 6 is 3 marks)

7 (a) Work out the value of $4x^3$ when $x = 2$

.....

(1)

(b) Make c the subject of the formula $a = b + 5c$

$c =$.....

(2)

(Total for Question 7 is 3 marks)

8 (a) Decrease 80 by 27%

.....

(3)

(b) Express 84 as a percentage of 240

..... %

(2)

(Total for Question 8 is 5 marks)

9

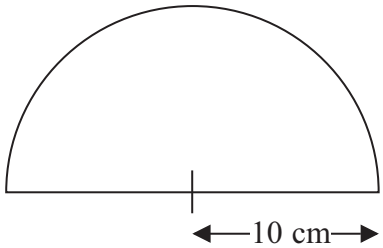


Diagram **NOT** accurately drawn

The diagram shows a semi-circle.
The radius of the semi-circle is 10 cm.

(a) Work out the area of the semi-circle.
Give your answer correct to 3 significant figures.

..... cm^2

(2)

(b) Work out the perimeter of the semi-circle.
Give your answer correct to 3 significant figures.

..... cm

(3)

(Total for Question 9 is 5 marks)

10 Share 240 in the ratio 2 : 3 : 5

.....

(Total for Question 10 is 3 marks)

11 $-2 < n \leqslant 3$
n is an integer.

(a) Write down all the possible values of n.

.....

(2)

x is a number.
Another number is 9 greater than x.
Both numbers are whole numbers.

The total of the two numbers is less than 60

(b) Find the greatest possible value of x.

.....

(3)

(Total for Question 11 is 5 marks)

12 There are some counters in a bag.
The counters are green or blue or red.

25% of the counters are green.

$\frac{3}{5}$ of the counters are blue.

12 of the counters are red.

Work out the total number of counters in the bag.

.....

(Total for Question 12 is 4 marks)

13

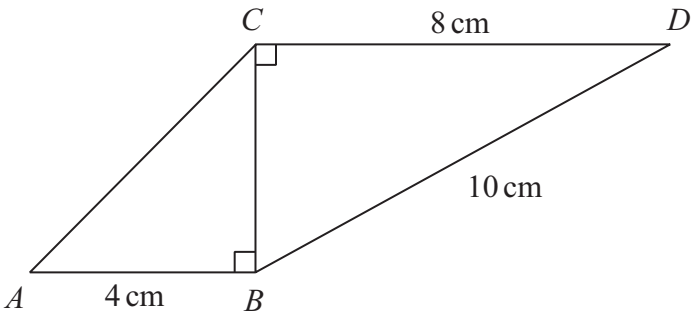


Diagram **NOT** accurately drawn

ABC and *BCD* are right-angled triangles.

AB = 4 cm.
BD = 10 cm.
CD = 8 cm.

Work out the length of *AC*.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 13 is 4 marks)

14 Work out $(9.5 \times 10^9) \div (3.8 \times 10^3)$
Give your answer in standard form.

.....

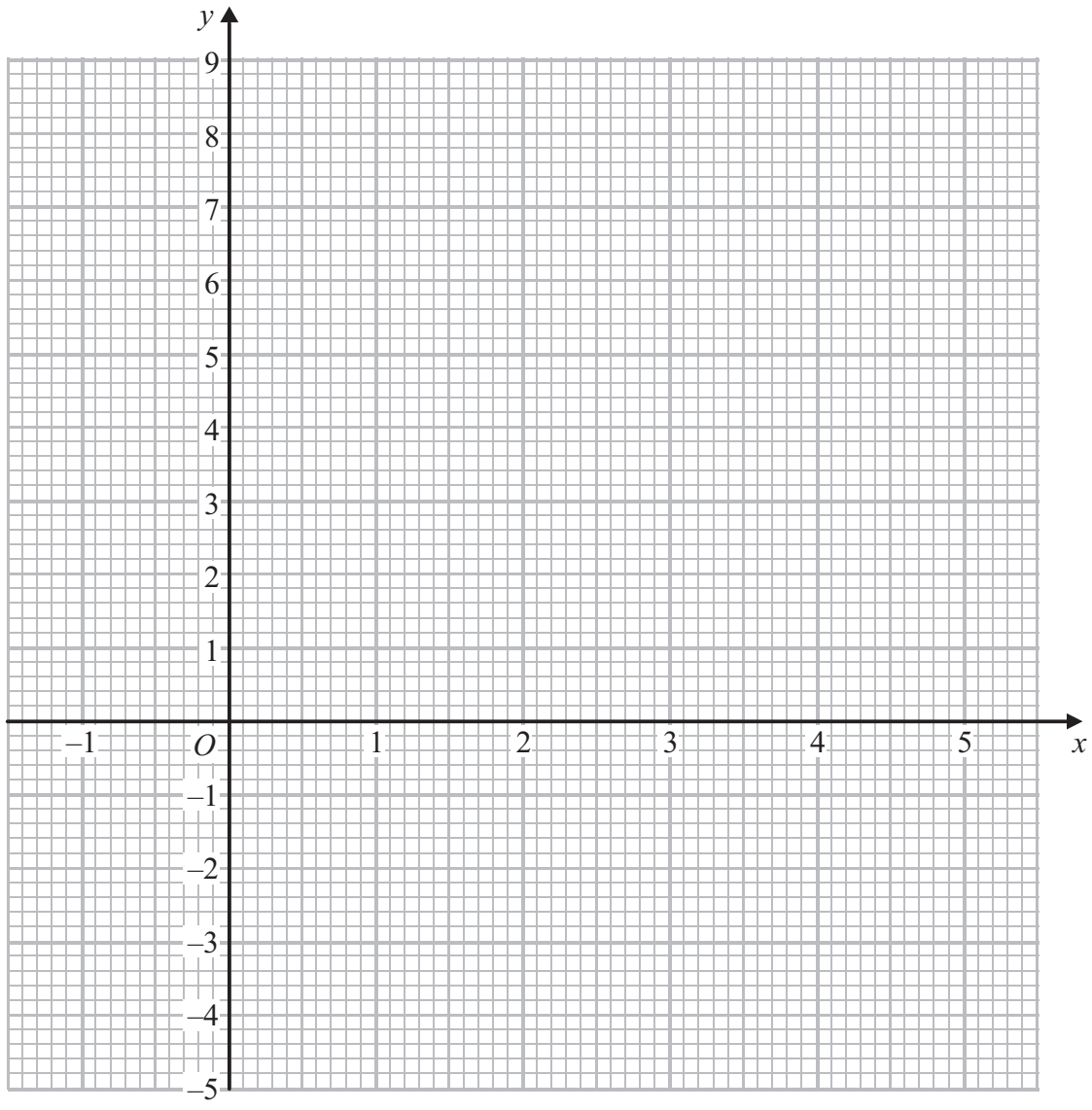
(Total for Question 14 is 2 marks)

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

x	– 1	0	1	2	3	4	5
y			–4		–2	2	

(2)

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



(2)

(c) Use your graph to find estimates of the values of x for which $x^2 - 3x - 2 = 0$

.....

(2)

(Total for Question 15 is 6 marks)

16 ABC is a triangle.

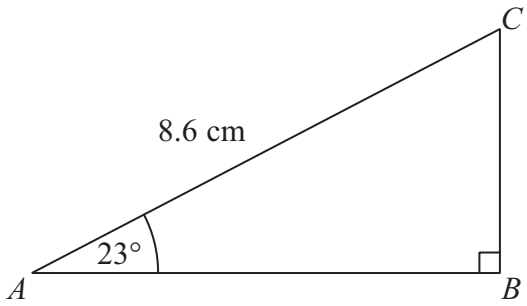


Diagram **NOT** accurately drawn

Angle $ABC = 90°$
Angle $CAB = 23°$
$AC = 8.6$ cm.

Work out the length of AB.
Give your answer correct to 3 significant figures.

.....cm

(Total for Question 16 is 3 marks)

17 A number is increased by 35%.
The result is 216

Work out the number.

.....

(Total for Question 17 is 3 marks)

18 Solve the simultaneous equations

$$4x + 3y = -7$$
$$3x - 4y = 26$$

$x =$.....

$y =$.....

(Total for Question 18 is 4 marks)

19 The straight line **A** has equation $y = 3x - 2$

The straight line **B** is parallel to **A** and passes through the point (0, 4).

Write down an equation for line **B**.

.....

(Total for Question 19 is 2 marks)

20 Solve $3x^2 + 2x - 4 = 0$

Give your solutions correct to 3 significant figures.

.....

(Total for Question 20 is 3 marks)

21 ABC is a triangle.

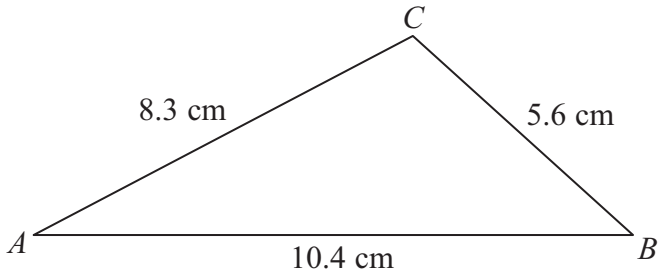


Diagram **NOT** accurately drawn

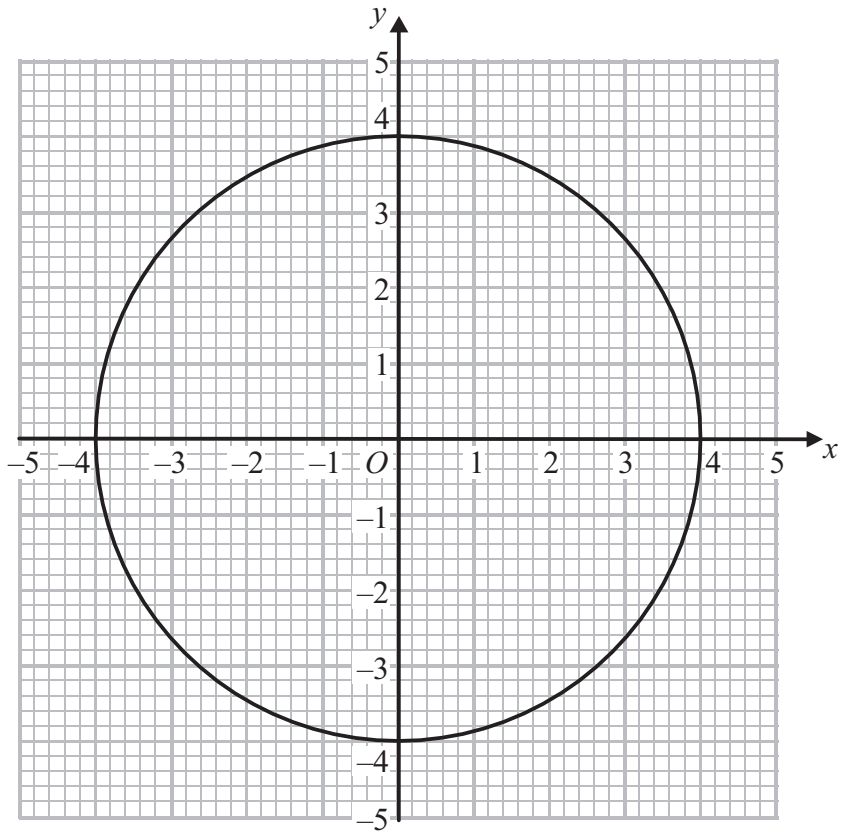
$AB = 10.4$ cm.
$AC = 8.3$ cm.
$BC = 5.6$ cm.

Calculate the area of the triangle.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 21 is 5 marks)

22



The diagram shows a circle of radius 4 cm, centre (0, 0).

By drawing a suitable straight line on the diagram, find estimates for the solutions of

$$x^2 + y^2 = 16$$

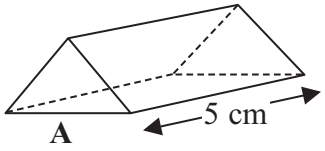
$$x + y = 2$$

$x =$ ....., $y =$ .....

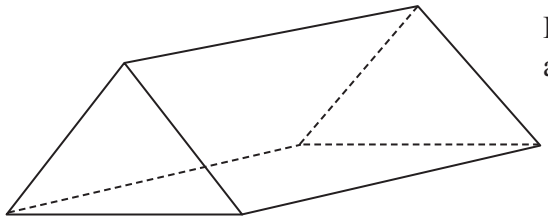
$x =$ ....., $y =$ .....

(Total for Question 22 is 3 marks)

23



A



B

Diagram **NOT** accurately drawn

Prism **A** and prism **B** are mathematically similar.

Prism **A** has a total surface area of 104 cm^2.
Prism **B** has a total surface area of 936 cm^2.

Prism **A** has a length of 5 cm.

(a) Work out the length of prism **B**.

.....cm

(3)

Prism **B** has a volume of 1620 cm^3.

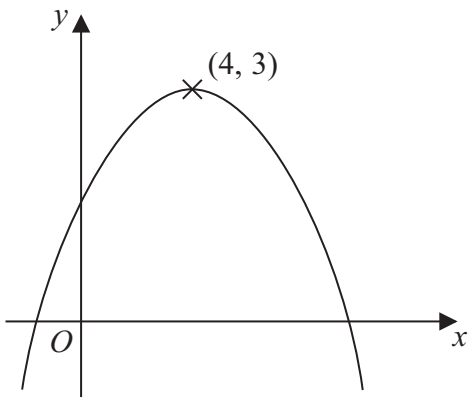
(b) Work out the volume of prism **A**.

.....cm^3

(2)

(Total for Question 23 is 5 marks)

24



The diagram shows part of the curve with equation $y = f(x)$.
The coordinates of the maximum point of the curve are (4, 3).

Write down the coordinates of the maximum point of the curve with equation

(a) $y = f(x) + 5$

(.....,.....)
(1)

(b) $y = 2f(x)$

(.....,.....)
(1)

(c) $y = f(4x)$

(.....,.....)
(1)

(Total for Question 24 is 3 marks)

25 The diagram shows a pyramid with base *ABC*.

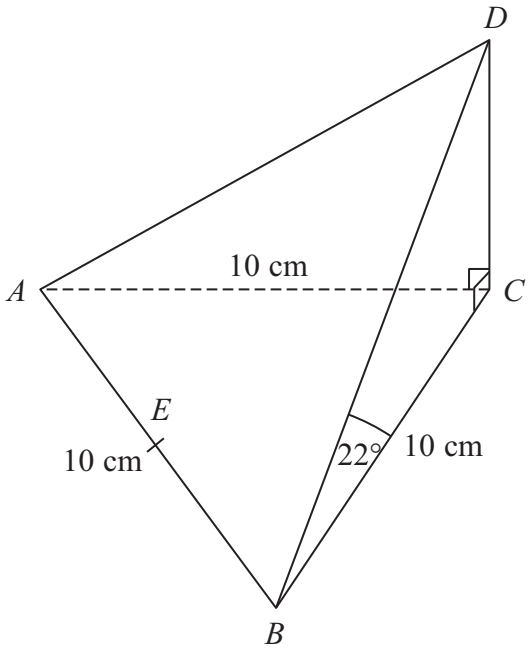


Diagram **NOT** accurately drawn

CD is perpendicular to both *CA* and *CB*.
Angle *CBD* = 22°
AB = *AC* = *BC* = 10 cm.
E is the midpoint of *AB*.

Calculate the size of the angle between the line *ED* and the plane *ABC*.
Give your answer correct to the nearest degree.

.....°

(Total for Question 25 is 5 marks)

26 Make r the subject of the formula $p = \dfrac{2r + 5}{r - 3}$

$r =$ .....

(Total for Question 26 is 4 marks)

27 The diagram shows a hemisphere on top of a cone.

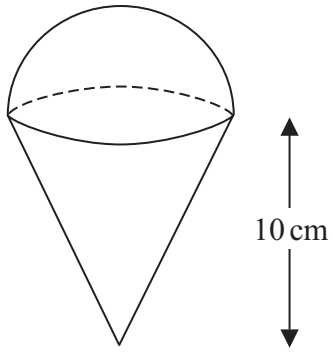


Diagram **NOT** accurately drawn

The radius of the hemisphere is equal to the radius of the cone.
The height of the cone is 10 cm.

The volume of the hemisphere is 400 cm^3.

Work out the volume of the cone.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 27 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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