Write your name here

Surname	Other names

Centre Number | | | | | |

Candidate Number | | | | |

Edexcel GCSE

Mathematics B

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

Higher Tier

Monday 17 June 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 ▶

P43614A

6/6/6/

P 4 3 6 1 4 A 0 1 2 0

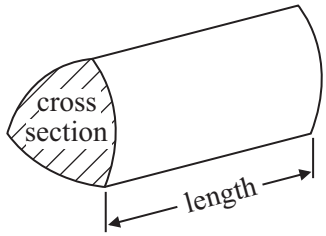
PEARSON

GCSE Mathematics 2MB01

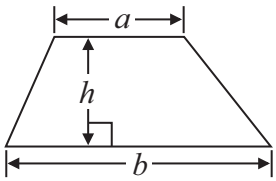
Formulae: Higher Tier

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

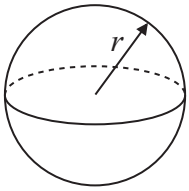


Area of trapezium = $\frac{1}{2}(a + b)h$



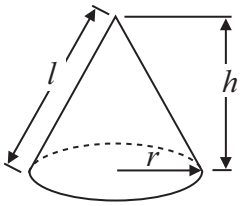
Volume of sphere = $\frac{4}{3}\pi r^3$

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

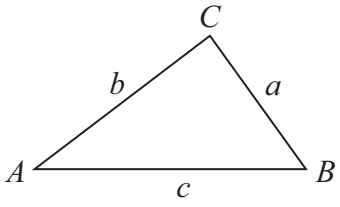


Volume of cone = $\frac{1}{3}\pi r^2 h$

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.

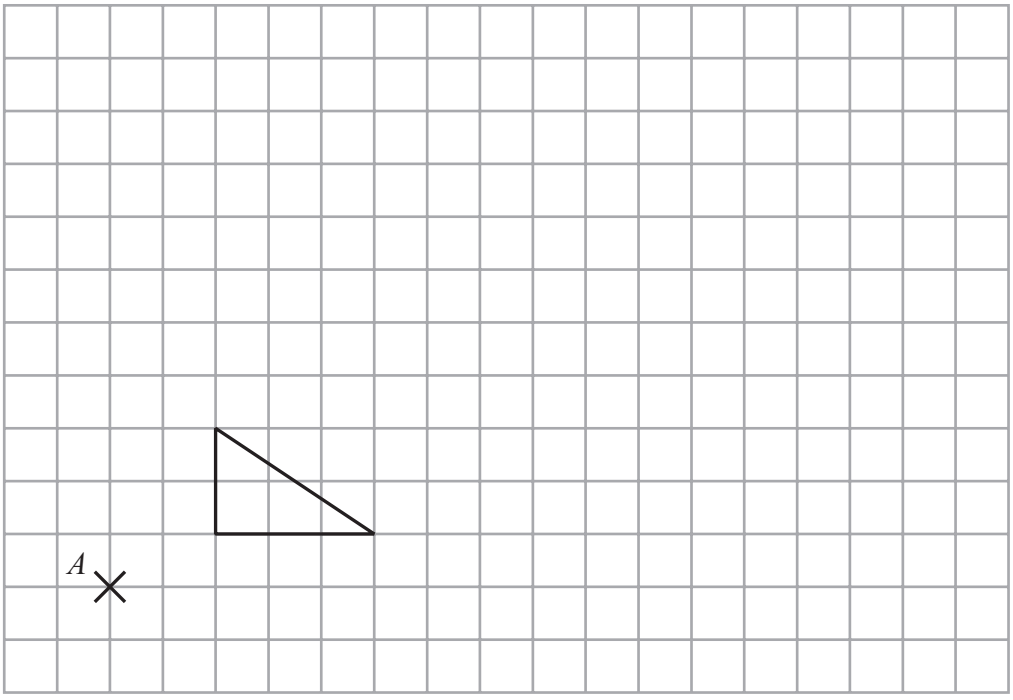
You must write down all stages in your working.

1 The cost of 6 cups is £7.80
Work out the cost of 10 of these cups.

£.....

(Total for Question 1 is 2 marks)

2



On the grid, enlarge the shape with scale factor 3, centre *A*.

(Total for Question 2 is 3 marks)

3 Use your calculator to work out $\dfrac{\sqrt{40.96}}{7.1 - 2.48}$

Write down all the figures on your calculator display.
You must give your answer as a decimal.

.....

(Total for Question 3 is 2 marks)

***4** The diagram shows a flower bed in the shape of a circle.

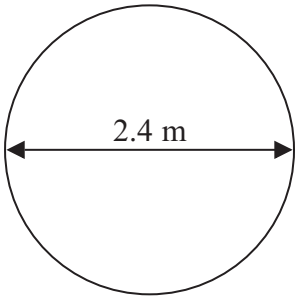


Diagram **NOT** accurately drawn

The flower bed has a diameter of 2.4 m.

Sue is going to put a plastic strip around the edge of the flower bed.
The plastic strip is sold in 2 metre rolls.

How many rolls of plastic strip does Sue need to buy?
You must show all your working.

(Total for Question 4 is 4 marks)

5 $k = 3e + 5$

(a) Work out the value of k when $e = -2$

.....

(2)

(b) Solve $4y + 3 = 2y + 14$

$y =$ .....

(2)

(c) Solve $3(x - 5) = 21$

$x =$ .....

(2)

$-3 < n < 4$
n is an integer.

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

.....

(2)

(Total for Question 5 is 8 marks)

6 The diagram shows the position of two boats, *B* and *C*.

Boat *T* is on a bearing of 060° from boat *B*.
Boat *T* is on a bearing of 285° from boat *C*.

In the space above, draw an accurate diagram to show the position of boat *T*.

Mark the position of boat *T* with a cross (×).
Label it *T*.

(Total for Question 6 is 3 marks)

7 Petra booked a family holiday.
The total cost of the holiday was £3500 **plus** VAT at 20%.

Petra paid £900 of the total cost when she booked the holiday.
She paid the rest of the total cost in 6 equal monthly payments.

Work out the amount of each monthly payment.

£.....

(Total for Question 7 is 5 marks)

8 Dan has some marbles.
Ellie has twice as many marbles as Dan.
Frank has 15 marbles.

Dan, Ellie and Frank have a total of 63 marbles.

How many marbles does Dan have?

.....

(Total for Question 8 is 3 marks)

***9** Ketchup is sold in three different sizes of bottle.

Small bottle Medium bottle Large bottle

A small bottle contains 342 g of ketchup and costs 88p
A medium bottle contains 570 g of ketchup and costs £1.95
A large bottle contains 1500 g of ketchup and costs £3.99

Which bottle is the best value for money?
You must show your working.

(Total for Question 9 is 4 marks)

10 *GHJ* is a right-angled triangle.

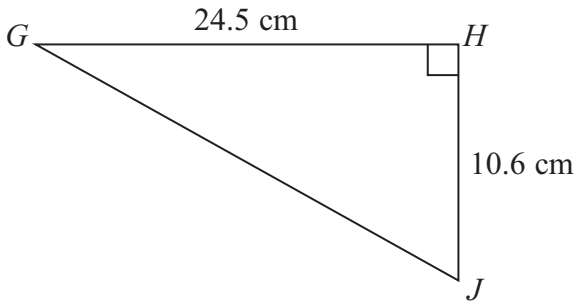


Diagram **NOT** accurately drawn

(a) Calculate the length of *GJ*.
Give your answer correct to one decimal place.

..... cm

(3)

LMN is a different right-angled triangle.

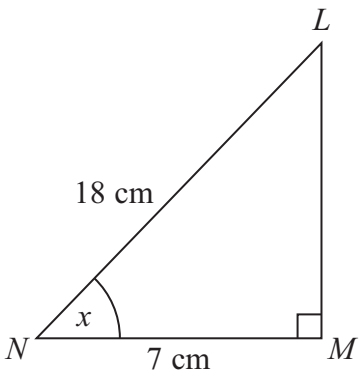


Diagram **NOT** accurately drawn

(b) Calculate the size of the angle marked *x*.
Give your answer correct to one decimal place.

..... °

(3)

(Total for Question 10 is 6 marks)

11 The equation

$$x^3 - 6x = 84$$

has a solution between 4 and 5

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

.....

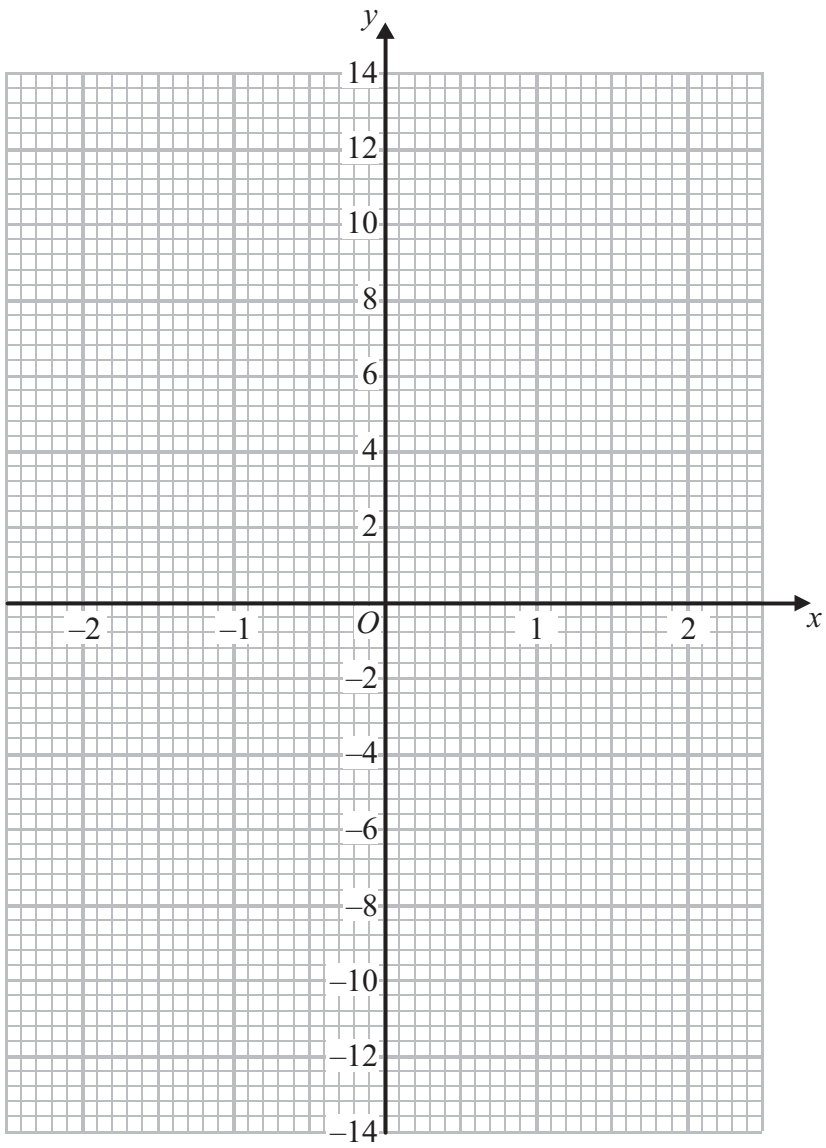
(Total for Question 11 is 4 marks)

12 (a) Complete this table of values for $y = x^3 + 2x - 1$

x	– 2	– 1	0	1	2
y		–4			11

(2)

(b) On the grid, draw the graph of $y = x^3 + 2x - 1$



(2)

(Total for Question 12 is 4 marks)

13 Solve the simultaneous equations

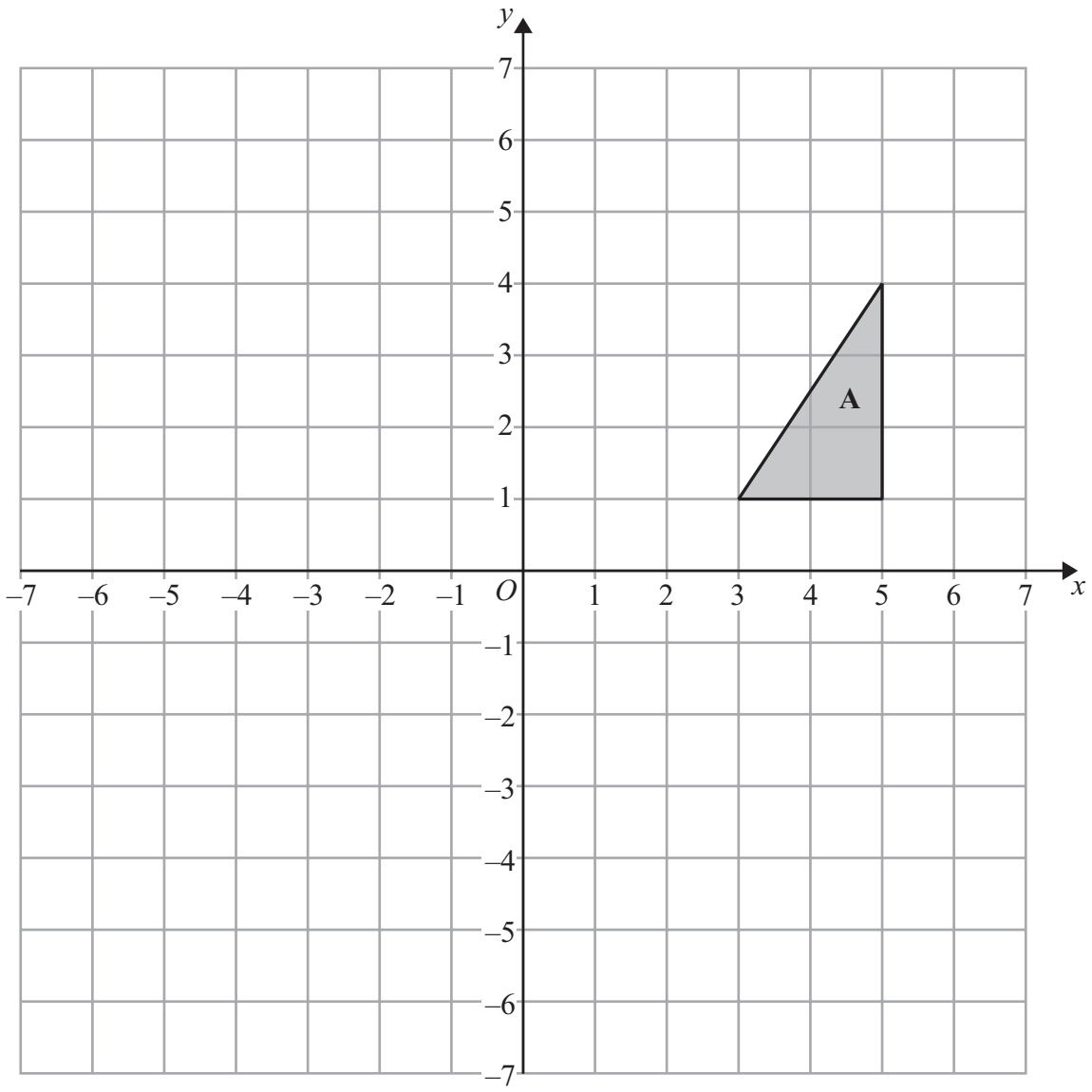
$$3x + 10y = 7$$
$$x - 4y = 6$$

$x =$ .....

$y =$ .....

(Total for Question 13 is 3 marks)

14



Triangle **A** is reflected in the x-axis to give triangle **B**.
Triangle **B** is then reflected in the line $x = 1$ to give triangle **C**.

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

.....

.....

.....

(Total for Question 14 is 3 marks)

***15** Ella wants to invest £6000 in a savings account for 2 years.

She finds information about savings accounts at two different banks.

Northway Bank
Compound interest
of
3.8% per annum

Portland Bank
Compound interest
of
5% per annum in year 1 3.2% per annum in year 2

Ella wants to choose the bank that pays the greater total amount of interest for the 2 years.

Which bank should she choose?
You must show all your working.

(Total for Question 15 is 4 marks)

16 Work out $\dfrac{4 \times 10^9 + 3.2 \times 10^7}{1.6 \times 10^{-6}}$

Give your answer in standard form.

.....

(Total for Question 16 is 2 marks)

17 T is inversely proportional to d^2

$T = 160$ when $d = 8$

Find the value of T when $d = 0.5$

.....

(Total for Question 17 is 3 marks)

18 Solve $5x^2 + 6x - 2 = 0$
Give your solutions correct to 2 decimal places.

.....

(Total for Question 18 is 3 marks)

19 *ABC* is a triangle.

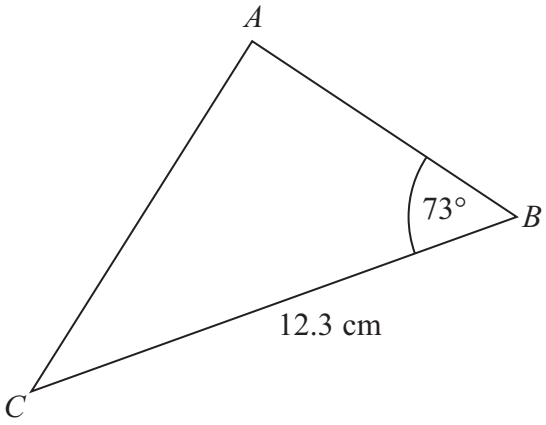


Diagram **NOT** accurately drawn

BC = 12.3 cm
Angle *ABC* = 73°

The area of triangle *ABC* is 50 cm^2.

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

..... cm

(Total for Question 19 is 6 marks)

20 OAB is a triangle.

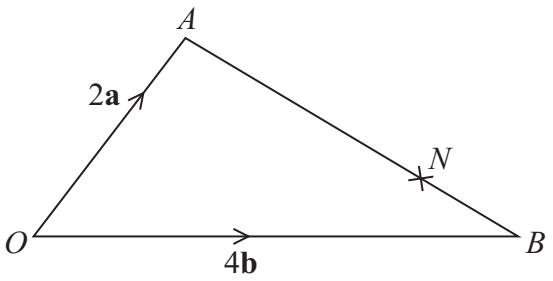


Diagram **NOT** accurately drawn

N is the point on AB such that $AN : NB = 3 : 1$

$\overrightarrow{OA} = 2\mathbf{a}$

$\overrightarrow{OB} = 4\mathbf{b}$

(a) Find $\overrightarrow{AB}$ in terms of **a** and **b**.

.....

(1)

(b) Find $\overrightarrow{ON}$ in terms of **a** and **b**.
Give your vector in its simplest form.

.....

(3)

(Total for Question 20 is 4 marks)

Turn over for Question 21

21 Sasha drops a ball from a height of d metres onto the ground.

The time, t seconds, that the ball takes to reach the ground is given by

$$t = \sqrt{\frac{2d}{g}}$$

where g m/s^2 is the acceleration due to gravity.

$d = 35.6$ correct to 3 significant figures.
$g = 9.8$ correct to 2 significant figures.

(a) Write down the lower bound of d.

.....

(1)

(b) Calculate the lower bound of t.
You must show all your working.

.....

(3)

(Total for Question 21 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS