Write your name here

Surname	Other names

Edexcel GCSE

Centre Number	Candidate Number

Mathematics B

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

Higher Tier

Tuesday 19 June 2012 – Afternoon
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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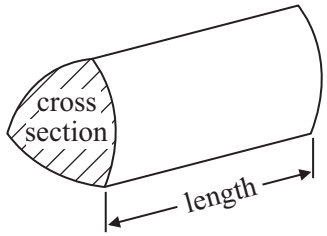
PEARSON

GCSE Mathematics 2MB01

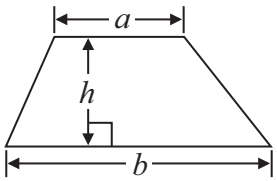
Formulae: Higher Tier

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

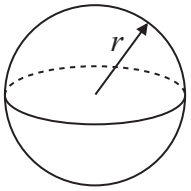


Area of trapezium = $\frac{1}{2}(a + b)h$



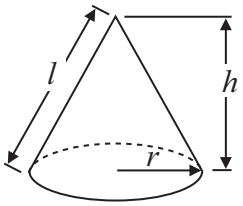
Volume of sphere = $\frac{4}{3}\pi r^3$

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

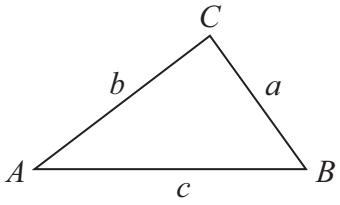


Volume of cone = $\frac{1}{3}\pi r^2 h$

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.

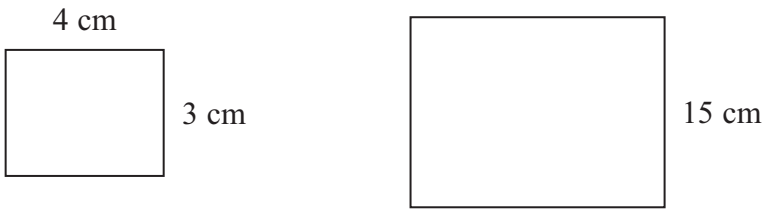
Write your answers in the spaces provided.

You must write down all stages in your working.

1 A small photograph has a length of 4 cm and a width of 3 cm.
Shez enlarges the small photograph to make a large photograph.

The large photograph has a width of 15 cm.

Diagram **NOT** accurately drawn



Small photograph Large photograph

The two photographs are similar rectangles.

Work out the length of the large photograph.

.....

(Total for Question 1 is 3 marks)

2 £500 is invested at a simple interest rate of 3% per year.

After how many years is the total interest £60?

..... years

(Total for Question 2 is 3 marks)

3 Work out $3\frac{1}{3} \div 4\frac{3}{4}$

.....

(Total for Question 3 is 2 marks)

4 A cooker costs £650 plus 20% VAT.

(a) Calculate the total cost of the cooker.

£ .....

(3)

A washing machine has a price of £260
In a sale its price is reduced by £39

(b) Write the reduction as a percentage of the price.

..... %

(2)

3 kitchen chairs cost a total of £44.79

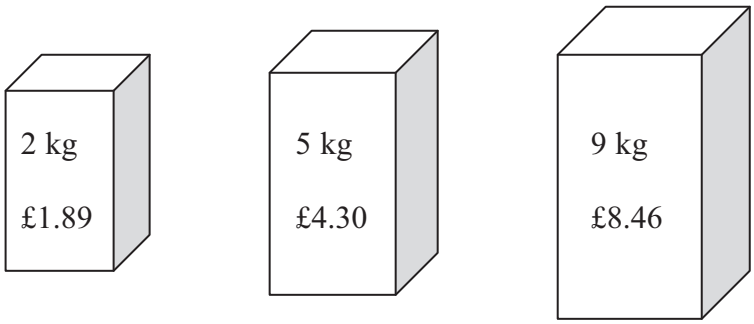
(c) Work out the total cost of 8 of these chairs.

£ .....

(2)

(Total for Question 4 is 7 marks)

***5** Soap powder is sold in three sizes of box.

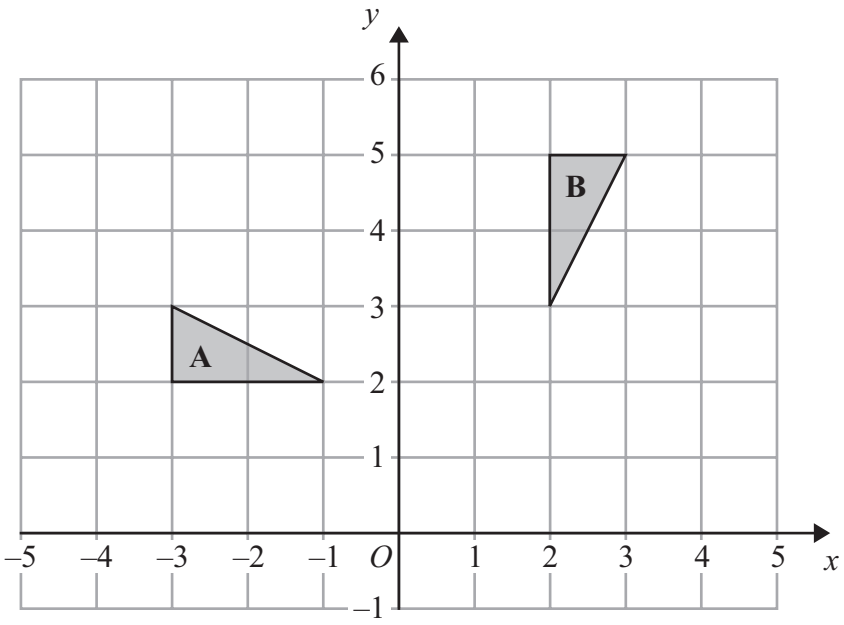


A 2 kg box of soap powder costs £1.89
A 5 kg box of soap powder costs £4.30
A 9 kg box of soap powder costs £8.46

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

(Total for Question 5 is 4 marks)

6



Describe fully the single transformation which maps triangle **A** onto triangle **B**.

.....

.....

(Total for Question 6 is 3 marks)

7 The equation $x^3 + 10x = 23$

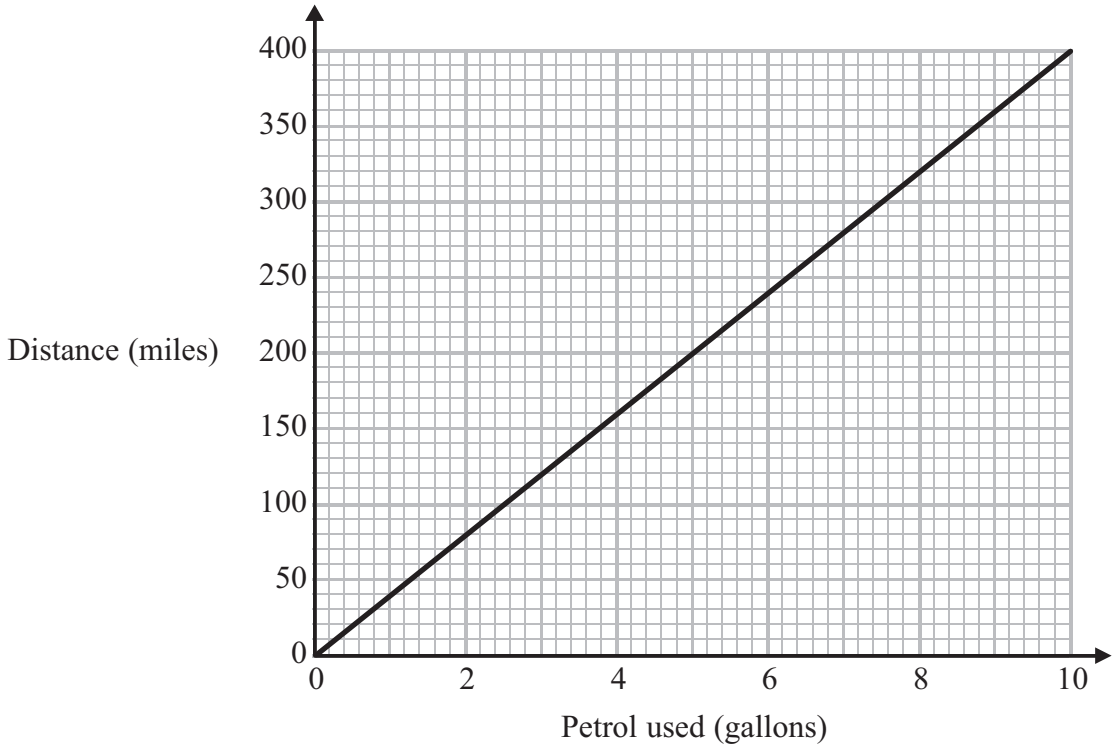
has a solution between 1 and 2

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 graph shows information about the distances travelled by a car for different amounts of petrol used.



(a) Find the gradient of the straight line.

.....

(2)

(b) Write down an interpretation of this gradient.

.....

.....

.....

(1)

(Total for Question 8 is 3 marks)

9 The diagram shows the marking on a school playing field.

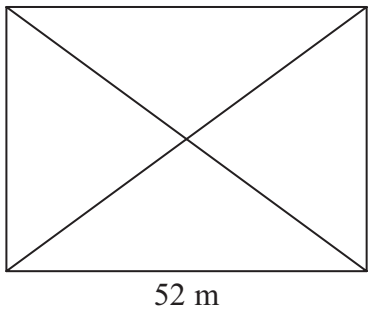


Diagram **NOT** accurately drawn

The diagram shows a rectangle and its diagonals.

Work out the total length of the four sides of the rectangle and its diagonals.

..... m

(Total for Question 9 is 5 marks)

10 Susie has to deliver some packages and some parcels.

The total number of packages is 4 times the number of parcels.
The total number of packages and parcels is 40

Each parcel has a weight of 1.5 kg.
The total weight of the packages and parcels is 37.6 kg.

Each of the packages has the same weight.

Work out the weight of each package.

..... kg

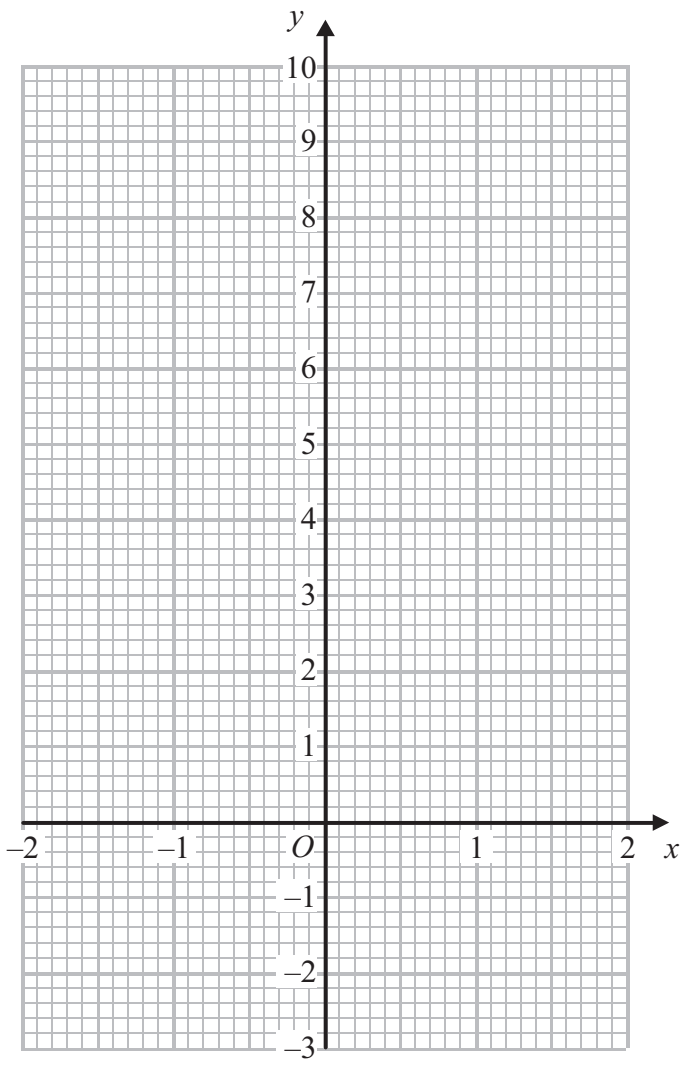
(Total for Question 10 is 4 marks)

11 (a) Complete the table of values for $y = 2x^2 - 1$

x	–2	–1	0	1	2
y	7			1	

(2)

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



(2)

(c) Use your graph to write down estimates of the solutions of the equation $2x^2 - 1 = 0$

.....

(2)

(Total for Question 11 is 6 marks)

12 An object is travelling at a speed of 2650 metres per second.

How many seconds will the object take to travel a distance of 3.45×10^{10} metres?
Give your answer in standard form, correct to 2 significant figures.

..... seconds

(Total for Question 12 is 3 marks)

13 y is directly proportional to x.

When $x = 600$, $y = 10$

(a) Find a formula for y in terms of x.

$y =$ .....

(3)

(b) Calculate the value of y when $x = 540$

$y =$ .....

(1)

(Total for Question 13 is 4 marks)

14 (a) Given that x is an integer such that $-2 < x \leqslant 3$

y is an integer such that $-1 \leqslant y < 5$

and $y = x$

write down the possible values of x.

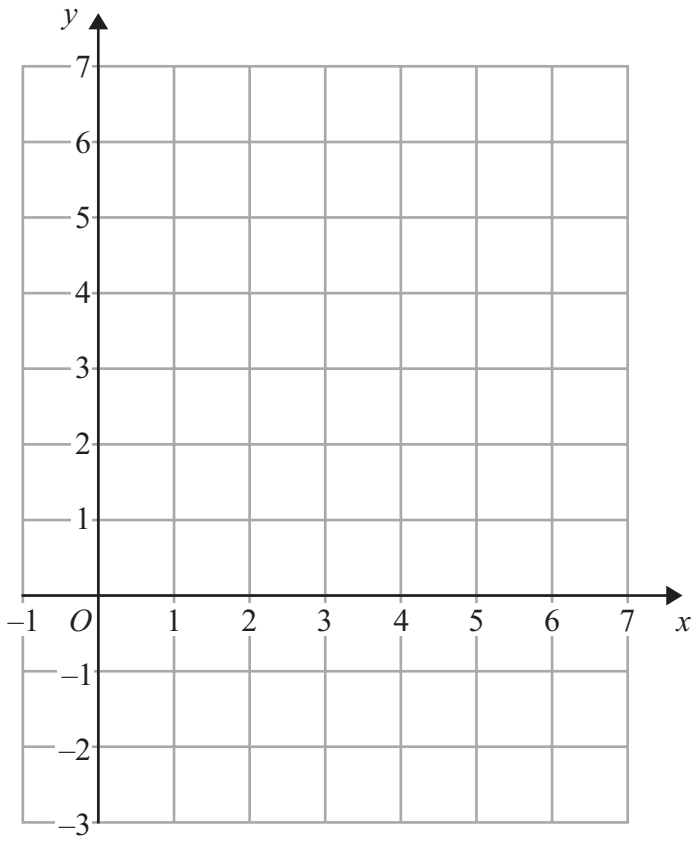
.....

(2)

(b) On the grid below, show by shading the region defined by the inequalities

$y > 1$ $y < 2x - 2$ $y < 6 - x$ $x > 0$

Mark this region with the letter R.



(4)

(Total for Question 14 is 6 marks)

15

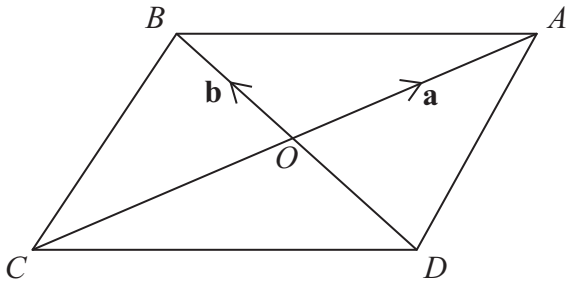


Diagram **NOT** accurately drawn

$ABCD$ is a parallelogram.
The diagonals of the parallelogram intersect at O.

$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$

(a) Write an expression, in terms of **a** and/or **b**, for

(i) $\overrightarrow{CA}$,

.....

(ii) $\overrightarrow{BA}$,

.....

(iii) $\overrightarrow{BC}$.

.....

(3)

X is the point such that $\overrightarrow{OX} = 2\mathbf{a} - \mathbf{b}$

(b) (i) Find an expression, in terms of **a** and **b**, for $\overrightarrow{AX}$.

.....

(ii) B, A and X lie on the same straight line.

Explain why.

.....

.....

.....

(3)

(Total for Question 15 is 6 marks)

16 (a) Make t the subject of the formula

$$2(a + t) = 5t + 7$$

$t =$ .....

(3)

(b) Solve the simultaneous equations

$$3x - 4y = 8$$

$$9x + 5y = -1.5$$

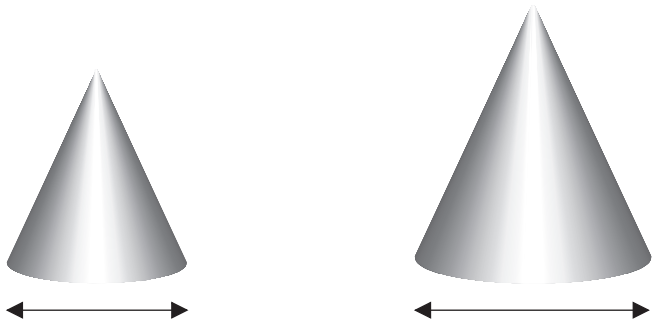
$x =$ .....

$y =$ .....

(3)

(Total for Question 16 is 6 marks)

17 Ali has two solid cones made from the same type of metal.



A **B**

Diagram **NOT** accurately drawn

The two solid cones are mathematically similar.
The base of cone **A** is a circle with diameter 80 cm.
The base of cone **B** is a circle with diameter 160 cm.

Ali uses 80 m*l* of paint to paint cone **A**.
Ali is going to paint cone **B**.

(a) Work out how much paint, in m*l*, he will need.

..... m*l*

(2)

The volume of cone **A** is 171 700 cm^3.

(b) Work out the volume of cone **B**.

..... cm^3

(3)

(Total for Question 17 is 5 marks)

18 *ABCD* is a quadrilateral.

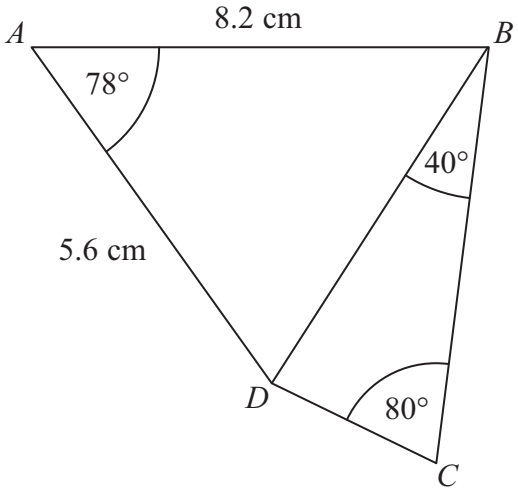


Diagram **NOT** accurately drawn

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

..... cm

(Total for Question 18 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

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