Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Unit 2: Number, Algebra, Geometry 1 (Non-Calculator)

Higher Tier

Friday 4 November 2016 – Morning
Time: 1 hour 15 minutes

Paper Reference
5MB2H/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. 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 must not be used.**

Information

- The total mark for this paper is 60
- 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 ▶

P48226A

6/6/6/6

P 4 8 2 2 6 A 0 1 1 6

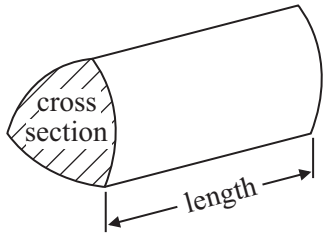
PEARSON

GCSE Mathematics 2MB01

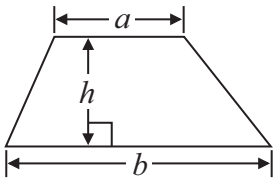
Formulae: Higher Tier

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

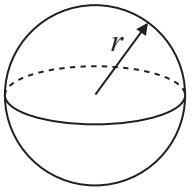


Area of trapezium = $\frac{1}{2}(a + b)h$



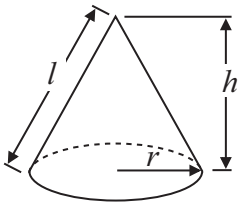
Volume of sphere = $\frac{4}{3}\pi r^3$

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

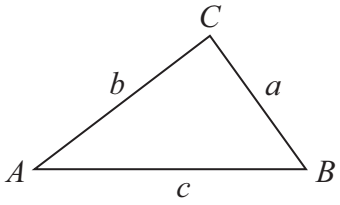


Volume of cone = $\frac{1}{3}\pi r^2 h$

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.

You must NOT use a calculator.

1 Here are the first 5 terms of an arithmetic sequence.

3 10 17 24 31

(a) Find an expression, in terms of n, for the nth term of this sequence.

.....

(2)

The nth term of a different sequence is $3n^2 + 5$

(b) Find the 4th term of this sequence.

.....

(2)

(Total for Question 1 is 4 marks)

2 (a) Expand and simplify $7a + 4(a - 2b)$

.....

(2)

(b) Simplify $n^6 \times n^5$

.....

(1)

(c) Factorise $5x + 10$

.....

(1)

(Total for Question 2 is 4 marks)

3 A supermarket car park has 200 spaces.
10% of the spaces are for staff.

The other spaces are for disabled people, for parents and for other customers in the ratio 1 : 2 : 7

Paul is going to paint a sign for each of the spaces for staff, for disabled people and for parents.
He is **not** going to paint signs for the spaces for other customers.

Work out the total number of spaces Paul is going to paint a sign for.

.....

(Total for Question 3 is 4 marks)

4 The diagram shows a solid prism.

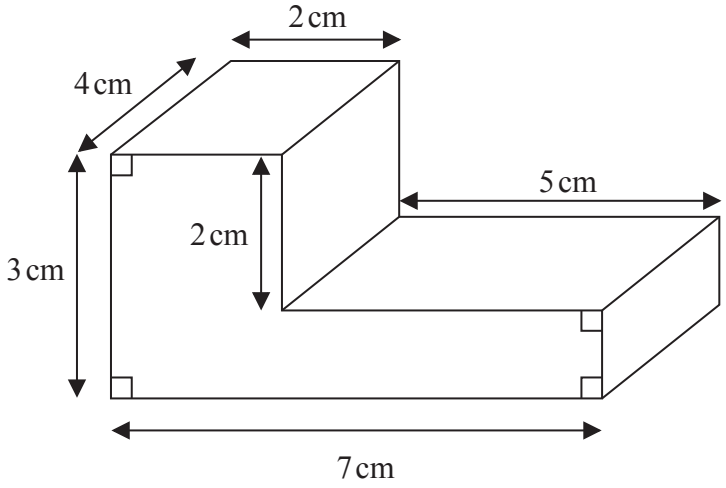


Diagram **NOT** accurately drawn

On the grid, draw an accurate plan of the solid prism.

(Total for Question 4 is 2 marks)

***5**

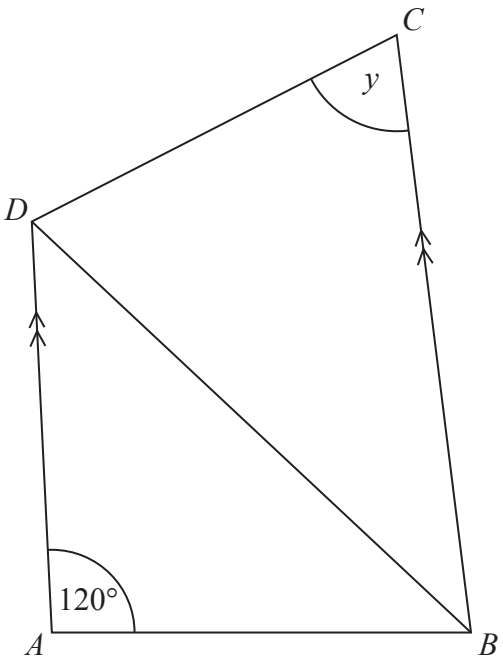


Diagram **NOT** accurately drawn

BCD and *ABD* are isosceles triangles.
AB = *AD*
BC = *BD*

AD is parallel to *BC*.

Work out the size of angle *y*.
You must give reasons for your answer.

(Total for Question 5 is 4 marks)

6 Regan cycles 78 miles in 6 hours.
His average speed for the first 30 miles is 15 miles per hour.

Work out Regan's average speed for the last 48 miles.

.....miles per hour

(Total for Question 6 is 3 marks)

***7** Tina is going from London to the French town of Lille.

Tina will drive from London to Dover.
She will go on the ferry from Dover to Calais.
She will then drive from Calais to Lille.

The distance from London to Dover is 80 miles.
The distance from Calais to Lille is 120 km.

5 miles = 8 km

Tina has enough fuel in her car to drive 150 miles.

Does she have enough fuel to get from London to Lille?
You must show all your working.

(Total for Question 7 is 3 marks)

8 Here is a prism.

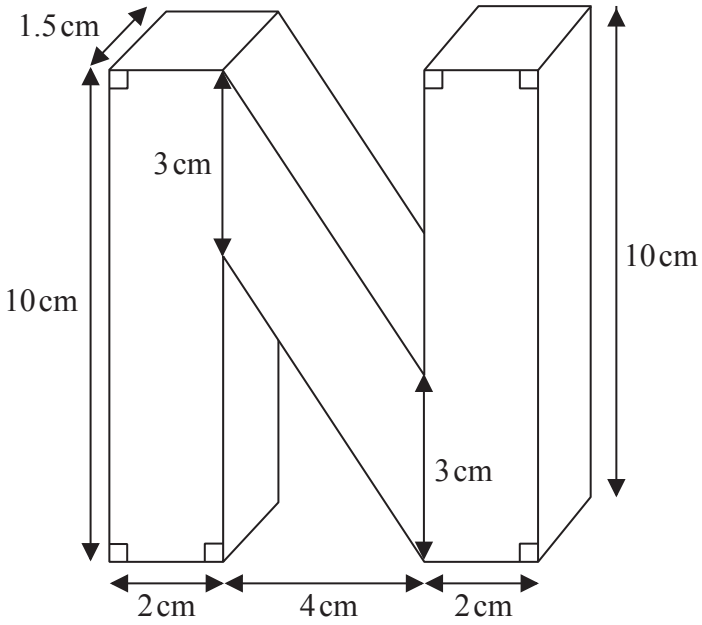


Diagram **NOT** accurately drawn

Work out the volume of the prism.

.....cm^3

(Total for Question 8 is 4 marks)

9 Here is a rectangle.

Diagram **NOT** accurately drawn

The rectangle has a width of $(2x - 3)$ cm.
It has an area of $(10x^2 - x - 21)$ cm^2.

Work out the length of the rectangle when $x = 4$

.....cm

(Total for Question 9 is 3 marks)

10 (a) Write down the value of

(i) 7^0

.....

(ii) 5^{-2}

.....

(iii) $16^{\frac{1}{2}}$

.....

(3)

(b) Simplify fully $\dfrac{10a^7b^4}{2a^3b}$

.....

(2)

(Total for Question 10 is 5 marks)

11 Work out $\left(4\frac{3}{5} - 2\frac{2}{3}\right) \div 2\frac{1}{3}$

.....

(Total for Question 11 is 4 marks)

12 (a) Write 2.3×10^{-4} as an ordinary number.

.....

(1)

The populations of 3 cities A, B and C are shown in the table below.

City	Population
A	5.86×10^6
B	4 200 000
C	5.3 million

(b) Write the cities in order of the size of their population.
Show the city with the greatest size of population first.

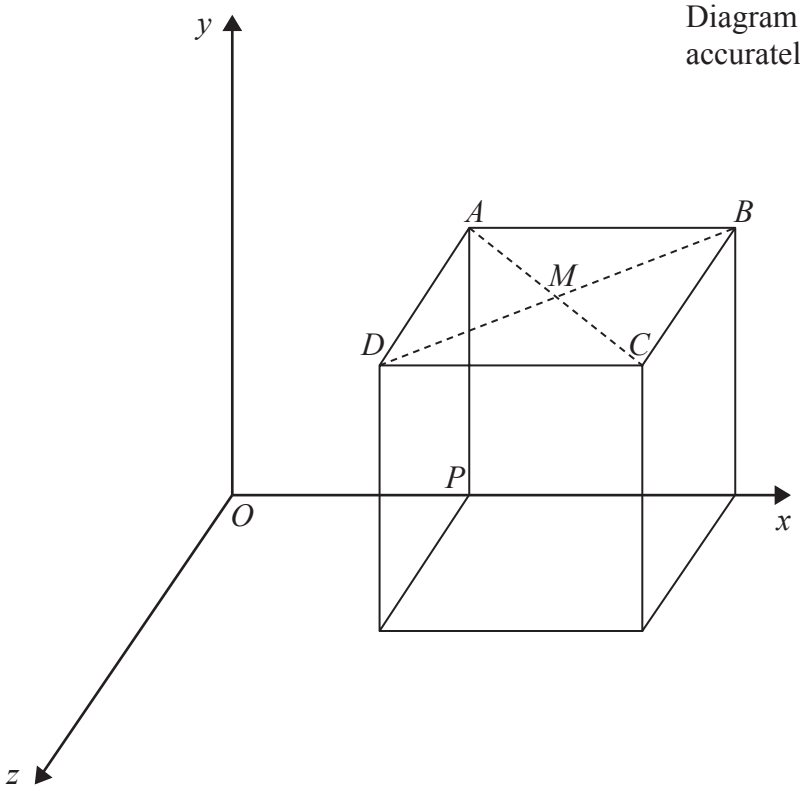
.....

(2)

(Total for Question 12 is 3 marks)

13 The diagram shows a cube on a 3-D grid.

Diagram **NOT** accurately drawn



The coordinates of vertex P are (3, 0, 0).
The coordinates of vertex B are (5, 2, 0).

Another vertex of the cube has coordinates (3, 0, 2).

(a) Write down the coordinates of vertex C.

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

(1)

M is the point where the diagonals of the top face of the cube intersect.

(b) Work out the coordinates of M.

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

(2)

(Total for Question 13 is 3 marks)

***14**

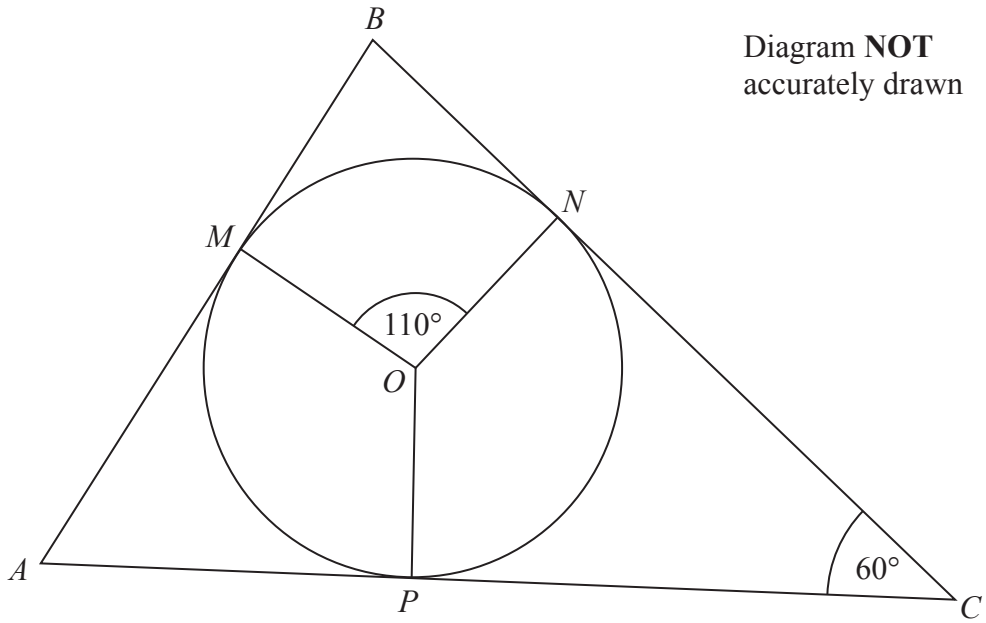


Diagram **NOT** accurately drawn

M, *N* and *P* are points on the circumference of a circle, centre *O*.
AMB, *BNC*, and *CPA* are tangents to the circle.

Angle *MON* = 110°
Angle *BCA* = 60°

Work out the size of angle *BAC*.
Give reasons for each stage of your working.

(Total for Question 14 is 4 marks)

15 Simplify fully $\dfrac{7x^2 - 21x}{x^2 + 2x - 15}$

.....

(Total for Question 15 is 3 marks)

16 Here is a trapezium.

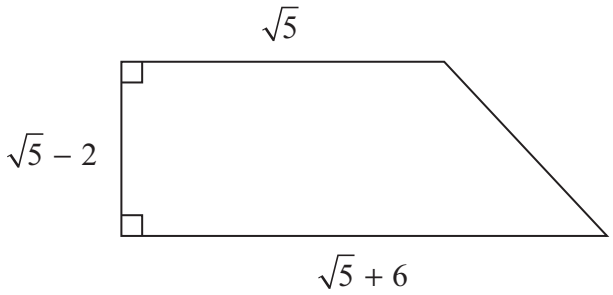


Diagram **NOT** accurately drawn

All measurements shown are in centimetres.

Work out the area of the trapezium.
Give your answer in cm^2 in the form $a\sqrt{5} + b$ where a and b are integers.

..... cm^2

(Total for Question 16 is 3 marks)

17

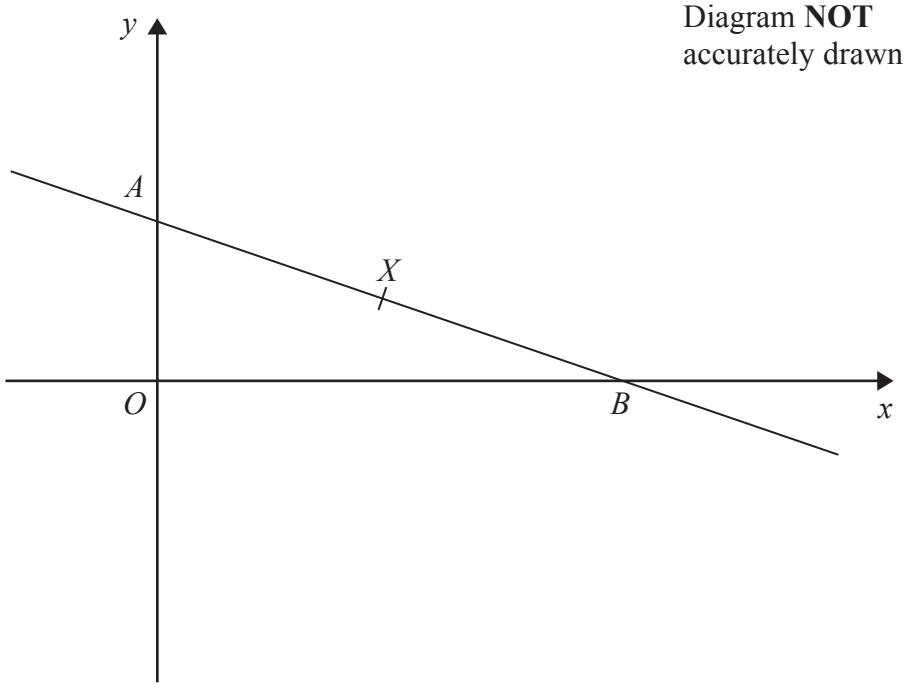


Diagram **NOT** accurately drawn

In the diagram A is the point (0, 2)
B is the point (6, 0)
X is the point (3, 1)

Find an equation of the line through X that is perpendicular to AB.

(Total for Question 17 is 4 marks)

TOTAL FOR PAPER IS 60 MARKS

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