Write your name here

Surname	Other names

**Pearson
Edexcel GCSE**

Centre Number

Candidate Number

Methods in Mathematics
Unit 2: Methods 2
For Approved Pilot Centres ONLY

Higher Tier

Wednesday 12 November 2014 – 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.
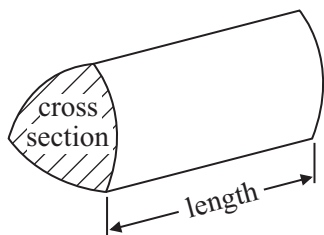- Check your answers if you have time at the end.
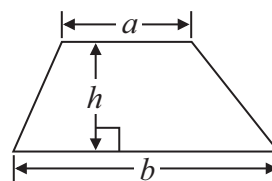
Turn over ▶

PEARSON

Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

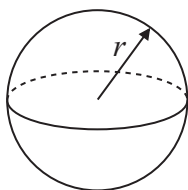**Volume of prism** = area of cross section × length
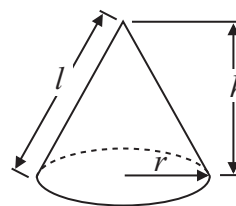

Area of trapezium = $\frac{1}{2}(a + b)h$

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

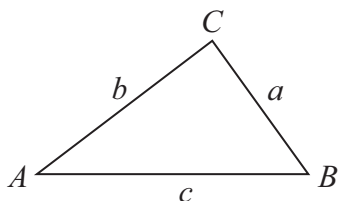**Surface area of sphere** = $4\pi r^2$

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

Curved surface area of cone = $\pi r l$

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 $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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) Divide 1064 in the ratio 3 : 4

....

(2)

(b) Some money is shared in the ratio 7 : 9
What percentage is the greater share?

....%

(3)

(Total for Question 1 is 5 marks)

2 Decrease 280 by $17\frac{1}{2}$ %

....

(Total for Question 2 is 3 marks)
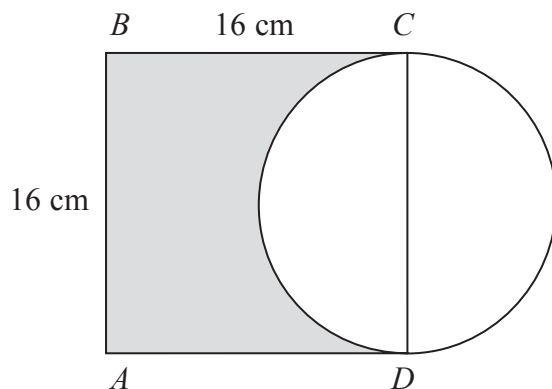
3 Here is a diagram showing a circle and a square.

Diagram **NOT** accurately drawn

The square, *ABCD*, has sides of length 16 cm.
The circle has a radius of 8 cm.

(a) Calculate the perimeter of the shaded shape.
Give your answer correct to 1 decimal place.

.... cm

(3)

(b) Calculate the percentage of the area of the square that is shaded.
Give your answer correct to 1 decimal place.

.... %

(4)

(Total for Question 3 is 7 marks)

4 $-9 < 4n \leqslant 12$

n is an integer.

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

....
(3)

(b) Tamsin thinks of a whole number.

She multiplies her number by 4 and then adds 3
Her answer is greater than 24

Find the smallest whole number that Tamsin could have thought of.

....
(3)

(Total for Question 4 is 6 marks)

*5   The diagram shows a solid shape made from a square-based pyramid and a cuboid.
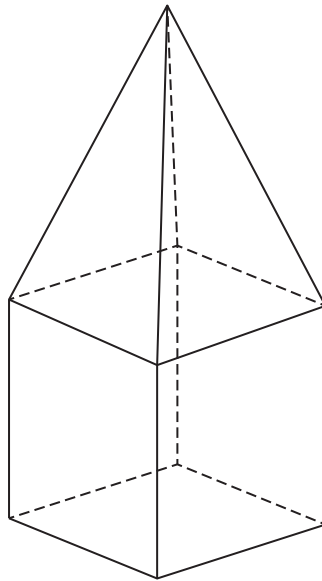

Diagram **NOT**
accurately drawn

The shape has
        1 face in the shape of a square,
        4 faces in the shape of a triangle,
        4 faces in the shape of a rectangle.

The area of each rectangle is 12% of the total surface area of the shape.
The total surface area of the shape is 600 cm^2
The area of each triangle is 62 cm^2

Which has the greater area, the square face or a rectangular face?
You must show all your working.

(Total for Question 5 is 6 marks)
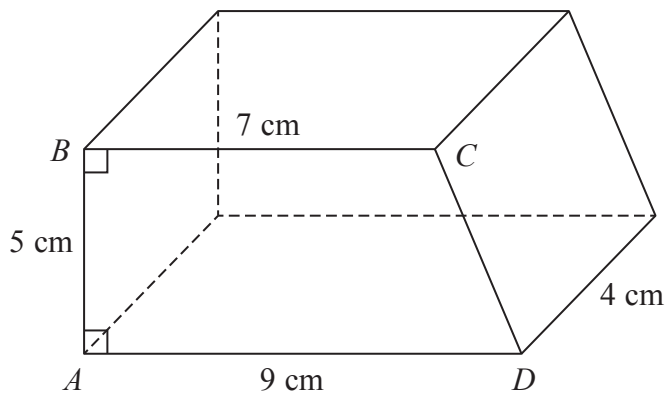
6 The diagram shows a solid prism.

7 cm

B

C

Diagram **NOT**
accurately drawn

5 cm

4 cm

A   9 cm   D

The cross section of the prism is a trapezium.
$AB = 5$ cm
$BC = 7$ cm
$AD = 9$ cm
The prism has a length of 4 cm.

(a) Calculate the volume of the prism.

.... cm³

(3)

Here is the face *ABCD* of the prism.
This face is a trapezium.

7 cm

B

C

Diagram **NOT**
accurately drawn

5 cm

A   9 cm   *D*
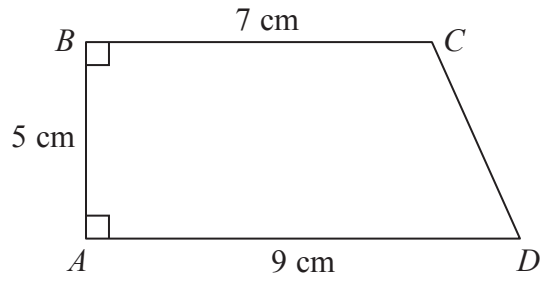
(b) Calculate the length of *CD*.
 Give your answer correct to 3 significant figures.

.... cm

(4)

(Total for Question 6 is 7 marks)

7 Here is a rectangle.

A ⬚

B ⬚

Diagram **NOT** accurately drawn

←———————— 40 cm ————————→
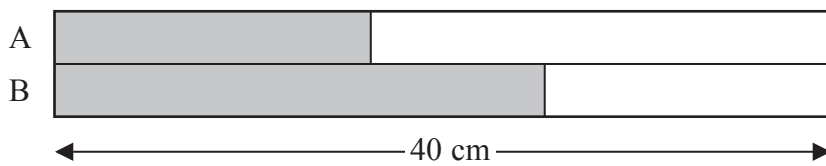
The rectangle has been divided into two strips, A and B.
The strips have the same width.

$\frac{2}{5}$ of strip A is shaded.

$\frac{5}{8}$ of strip B is shaded.

The length of the rectangle is 40 cm.
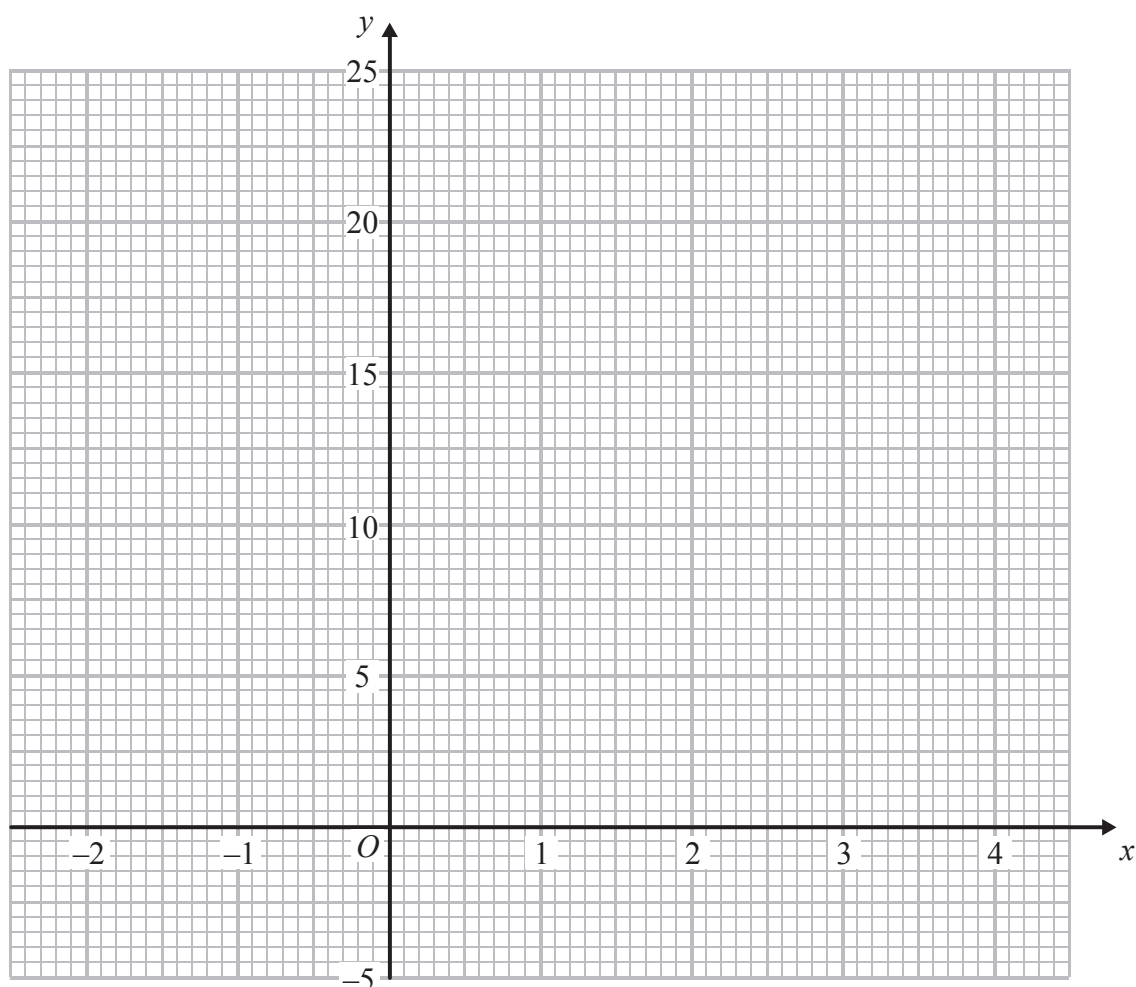
What fraction of the rectangle is **not** shaded?

....

(Total for Question 7 is 4 marks)

8 (a) Complete the table for $y = 2x^2 - 5x$

x	-2	-1	0	1	2	3	4
y		7				3	

(2)

(b) On the grid, draw the graph of $y = 2x^2 - 5x$

(2)

(c) Use the graph to find estimates of the solutions of the equation $2x^2 - 5x = 5$

....
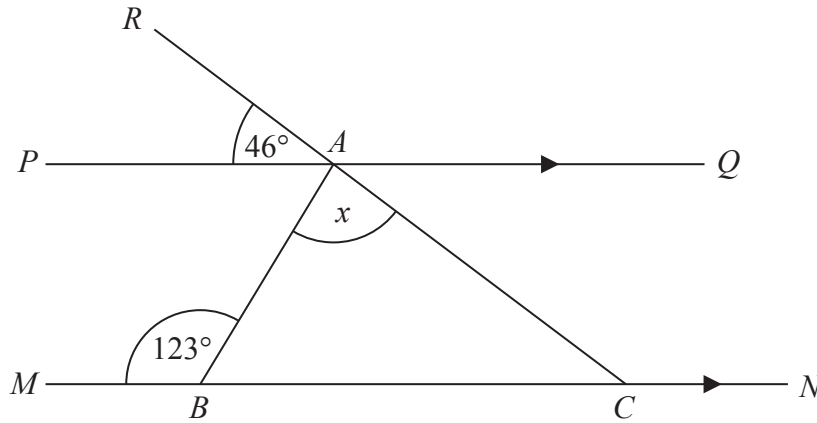
(2)

(Total for Question 8 is 6 marks)

*9

Diagram **NOT** accurately drawn

ABC is a triangle.
PAQ, *RAC*, and *MBCN* are straight lines.
Angle *ABM* = 123°
Angle *RAP* = 46°

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

(Total for Question 9 is 4 marks)

10 (a) Use your calculator to work out $\dfrac{\sqrt{(5.9 + 4.6)}}{3.7^2}$

Write down all the figures on your calculator display.

....

(2)

$\sqrt[3]{x} = 6$

(b) Find the value of x.

....

(1)

$y^4 = 256$

(c) Find a value of y.

....

(1)

(Total for Question 10 is 4 marks)

11 (a) *ABC* is a right-angled triangle.
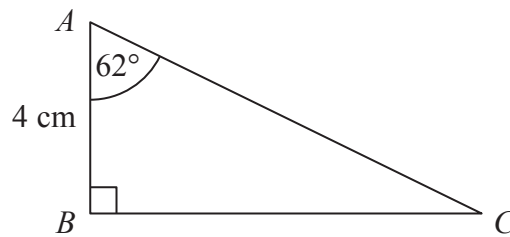

Diagram **NOT** accurately drawn

AB = 4 cm
Angle *CAB* = 62°

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

.... cm

(3)

(b) *PQR* is a right-angled triangle.
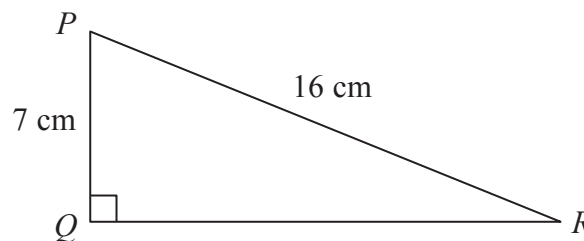

Diagram **NOT** accurately drawn

PQ = 7 cm
PR = 16 cm

Work out the size of the angle *PRQ*.
Give your answer correct to 3 significant figures.

.....................................°

(3)

(Total for Question 11 is 6 marks)

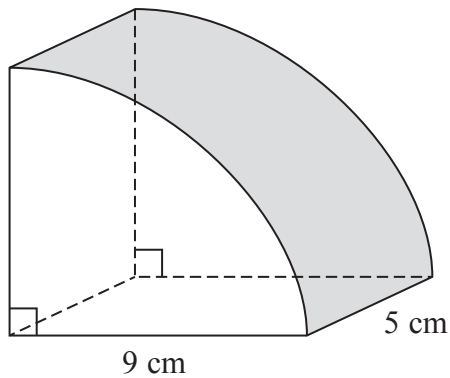**12** The diagram shows a quarter of a cylinder.

Diagram **NOT** accurately drawn

9 cm

5 cm

The cylinder has a radius of 9 cm and a length of 5 cm.

Work out the area of the curved surface, shown shaded in the diagram.
Give your answer correct to 3 significant figures.

.... cm²

(Total for Question 12 is 3 marks)

Turn over ▶

13 Find an equation of a line parallel to the line $y = 3x + 4$ that passes through the point (2, 5).

....

(Total for Question 13 is 3 marks)

14 (a) Make x the subject of $\qquad 3(x + 2) = y + x$

....

(3)

(b) Solve $\quad x^2 - 3x - 27 = 0$

Give your solutions correct to 2 decimal places.

....

(3)

(Total for Question 14 is 6 marks)

15 The diagram shows three sides of a regular polygon.

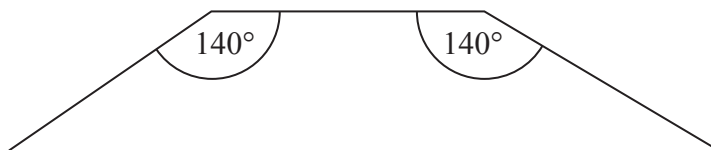140°   140°   Diagram **NOT** accurately drawn

Each interior angle of the regular polygon is 140°

Work out the number of sides of the regular polygon.
You must show all your working.

....

(Total for Question 15 is 3 marks)

16 Work out the value of

$$\frac{(2.4 \times 10^8) + (1.5 \times 10^6)}{2 \times (1.5 \times 10^6)}$$

....

(Total for Question 16 is 2 marks)

17 A number is increased by 12%.
The result is decreased by 9% to give the final answer.

Calculate the percentage change between the original number and the final answer.

....

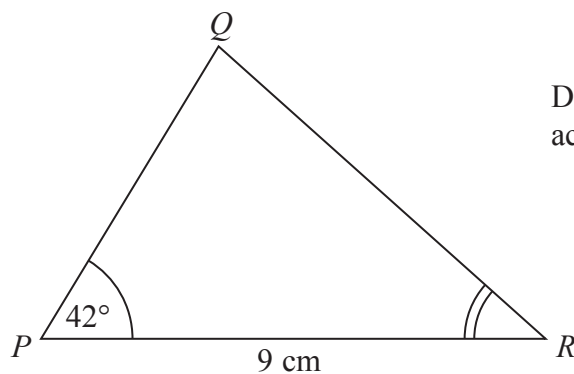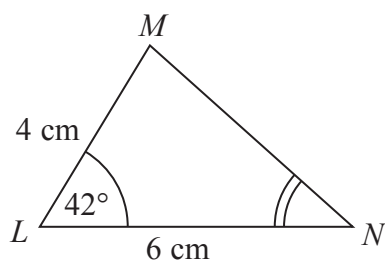**(Total for Question 17 is 3 marks)**

18 *LMN* and *PQR* are two mathematically similar triangles.

Diagram **NOT** accurately drawn

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

.... cm

(Total for Question 18 is 5 marks)

19 S is inversely proportional to the cube of t.

When $t = 4$, $S = \dfrac{1}{2}$
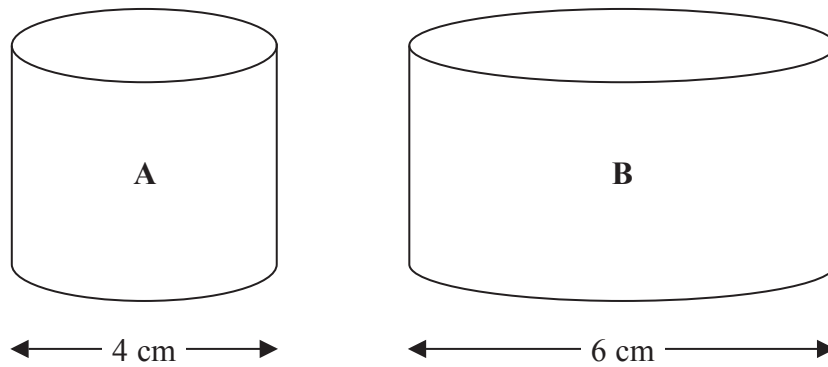
Find the value of S when $t = 8$

....

(Total for Question 19 is 4 marks)

20 Here are two cylinders.

Diagram **NOT** accurately drawn

A

B

$\longleftarrow$ 4 cm $\longrightarrow$ $\longleftarrow$ 6 cm $\longrightarrow$

The height of cylinder **A** is the same as the height of cylinder **B**.

The diameter of cylinder **A** is 4 cm.
The diameter of cylinder **B** is 6 cm.

Work out the ratio of the volume of cylinder **A** to the volume of cylinder **B**.

....

(Total for Question 20 is 2 marks)

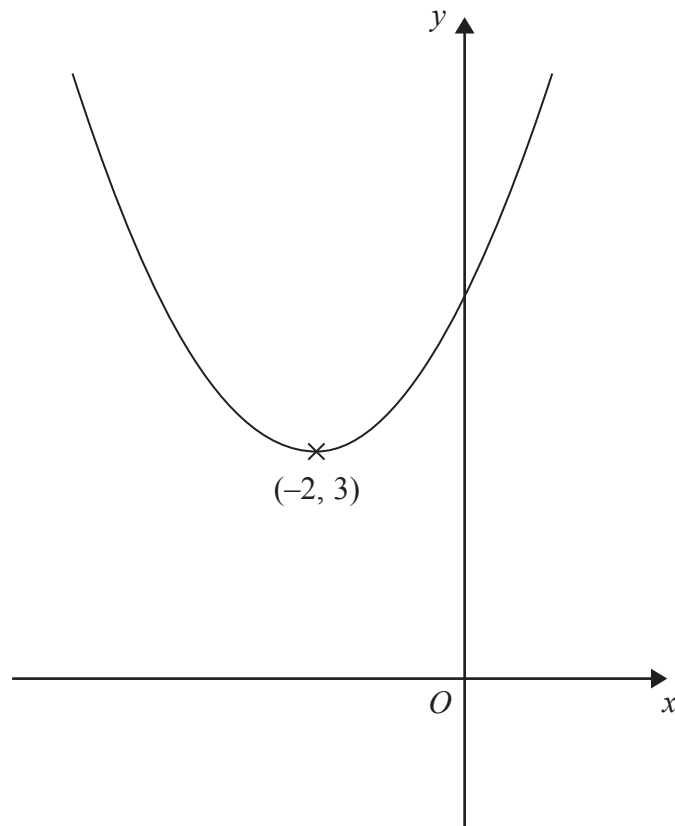***21** $x = 0.0\overset{..}{3}\overset{.}{6}$

Prove algebraically that x can be written as $\dfrac{4}{110}$

(Total for Question 21 is 3 marks)

Turn over ▶

22 The diagram shows part of the curve with equation $y = f(x)$
The coordinates of the minimum point of the curve are $(-2, 3)$

(−2, 3)

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

(i) $y = f(x) + 2$

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

(ii) $y = f(x - 6)$

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

(Total for Question 22 is 2 marks)

23 Solve the simultaneous equations

$$x^2 + y^2 = 2$$
$$2x + 1 = y$$

$x =$ .... and $y =$ ....

or $x =$ .... and $y =$ ....

(Total for Question 23 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS

BLANK PAGE

BLANK PAGE

BLANK PAGE