

Write your name here

Surname

Other names

**Pearson Edexcel
International GCSE**

Centre Number

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Candidate Number

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Mathematics B

**Level 2
Paper 1**



Sample assessment material for first teaching September 2016

Time: 1 hour 30 minutes

Paper Reference

4MB1/01

You must have:

Ruler graduated in centimetres and millimetres, protractor, 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.**

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.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.
- Without sufficient working, correct answers may be awarded no marks.

Turn over ►

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PEARSON

Answer ALL TWENTY EIGHT questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 Express $22\frac{1}{2}$ minutes as a percentage of one hour.

.....
(Total for Question 1 is 2 marks)

- 2 Without using a calculator and showing all your working, work out

$$3\frac{1}{8} \div 4\frac{1}{10}$$

Give your answer as a fraction in its simplest form.

.....
(Total for Question 2 is 2 marks)

- 3 Solve $\frac{2x+5}{4} = 1$

$x =$

(Total for Question 3 is 2 marks)

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4 Find the highest common factor (HCF) of 42, 84 and 154

HCF =

(Total for Question 4 is 2 marks)

5 The n th term of a sequence is given by $3n - 5$

Write down the first three terms of the sequence.

.....,,

(Total for Question 5 is 2 marks)

6 (a) Write down the number of lines of symmetry of an isosceles triangle.

.....
(1)

(b) Write down the order of rotational symmetry of the capital letter H.

.....
(1)

(Total for Question 6 is 2 marks)

7 The point A has co-ordinates $(3, -4)$, with respect to the origin O .

The point C is such that $\vec{AC} = \begin{pmatrix} -5 \\ 7 \end{pmatrix}$

Express, as a column vector, the position vector of C .

$\begin{pmatrix} \\ \end{pmatrix}$

(Total for Question 7 is 2 marks)

8 The lengths of the sides of a rectangle, measured to the nearest 10 mm, are 90 mm and 40 mm.

Find the smallest possible perimeter, in mm, of the rectangle.

.....mm

(Total for Question 8 is 2 marks)

- 9 A fair 6-sided red dice and a fair 6-sided blue dice are rolled. The score on the red dice and the score on the blue dice are added together to get the total.

Given that the score on the red dice is 1, find the probability that the total is **less than 4**

.....
(Total for Question 9 is 2 marks)

- 10 $(\sqrt{x} + \sqrt{3})^2 = y + 6\sqrt{2}$ where x and y are positive integers.

Find the value of x and the value of y .

$x =$, $y =$

(Total for Question 10 is 3 marks)

11 $\mathcal{E} = \{a, b, c, d, e, f, g, h, i, j\}$

$A = \{a, b, e, f\}$

$B = \{b, c, d, e, g, h\}$

$C = \{e, f, g, h, i, j\}$

Write down the elements of

(a) $A \cap B \cap C$

.....
(1)

(b) $(A \cup B)'$

.....
(1)

(c) $A' \cap C$

.....
(1)

(Total for Question 11 is 3 marks)

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12 The heights of two similar cylinders are in the ratio 58 : 2

The volume of the larger cylinder is 500 cm^3

Find the volume of the smaller cylinder.

..... cm^3

(Total for Question 12 is 3 marks)

13 The straight line L has equation $3y = x - 4$

(a) Find the gradient of L.

.....
(2)

(b) Find the intercept of L on the y-axis.

.....
(1)

(Total for Question 13 is 3 marks)

14 The probability that a train arrives on time at a station is 0.76

Mary has a list of all the trains that are due to arrive at the station on Monday. She picks, at random, a train from this list.

(a) Write down the probability that this train **will not** arrive on time at the station on Monday.

.....
(1)

600 trains arrive at this station on Monday.

(b) Work out an estimate for the number of trains that **do** arrive on time at this station on Monday.

.....
(2)

(Total for Question 14 is 3 marks)

15 Find an equation of the straight line that passes through the points with co-ordinates (1, 4) and (-2, -5).

.....
(Total for Question 15 is 3 marks)

16

$$\mathbf{A} = \begin{pmatrix} 3 & -1 \\ 1 & 2 \end{pmatrix} \quad \mathbf{B} = \begin{pmatrix} -4 & 2 \\ -3 & -1 \end{pmatrix}$$

Find

(a) $4\mathbf{A} - 3\mathbf{B}$

$$\begin{pmatrix} & \\ & \end{pmatrix}$$

(2)

(b) \mathbf{AB}

$$\begin{pmatrix} & \\ & \end{pmatrix}$$

(2)

(Total for Question 16 is 4 marks)

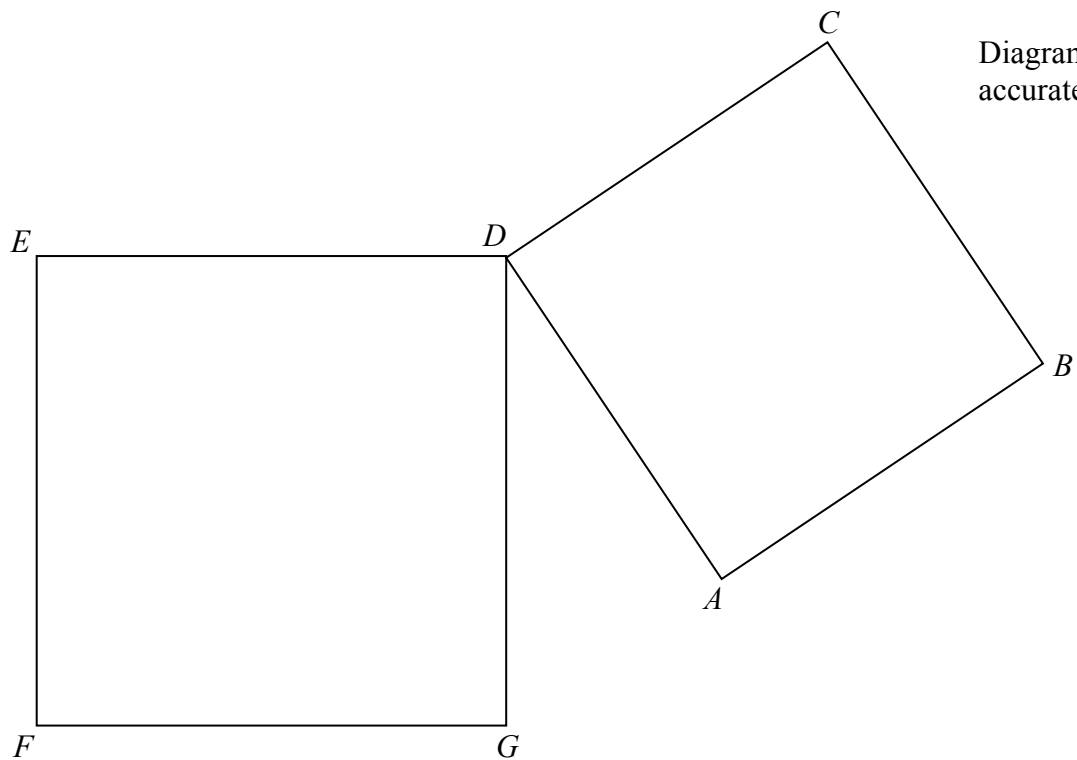


Diagram **NOT**
accurately drawn

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$ABCD$ and $DEFG$ are squares that are not identical.

Prove that $AE = CG$

(Total for Question 17 is 4 marks)

18 Solve the simultaneous equations

$$\begin{aligned}2x - y &= 2 \\ x + 3y &= 15\end{aligned}$$

$$x = \dots\dots\dots, y = \dots\dots\dots$$

(Total for Question 18 is 4 marks)

19 y varies directly as the square root of x .

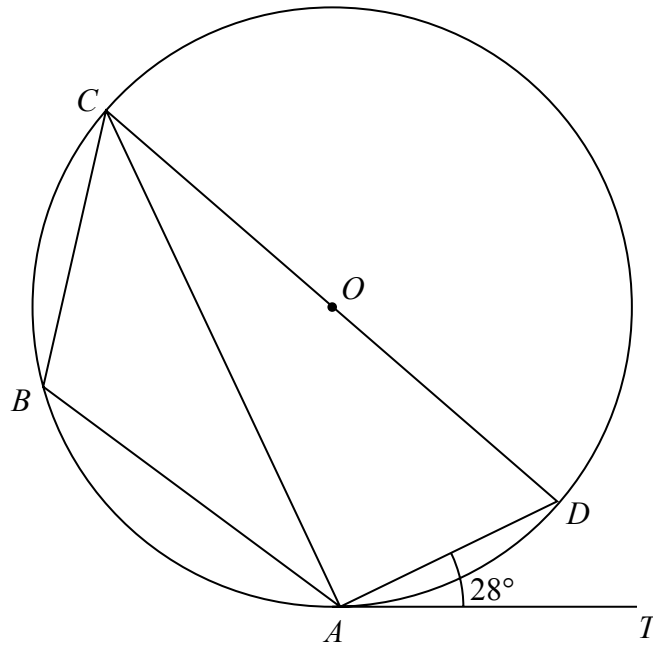
$$y = 52 \text{ when } x = 169$$

Find the value of x when $y = 68$

$$x = \dots\dots\dots$$

(Total for Question 19 is 4 marks)

Diagram **NOT** accurately drawn



$ABCD$ is a quadrilateral so that the points A , B , C and D lie on a circle, centre O , with COD a diameter.
 AT is the tangent to the circle at A and $\angle DAT = 28^\circ$

Find the size, in degrees, of

(a) $\angle CDA$,

.....
 (3)

(b) $\angle CBA$.

.....
 (1)

(Total for Question 20 is 4 marks)

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21 x , y and n are three consecutive **even** numbers.

(a) Write down expressions for x and y in terms of n .

$$x = \dots\dots\dots, y = \dots\dots\dots \quad (1)$$

(b) Hence, show that the sum of three consecutive even numbers is a multiple of 6

(2)

(c) Find three consecutive positive even numbers whose sum is a square number.

(1)

(Total for Question 21 is 4 marks)

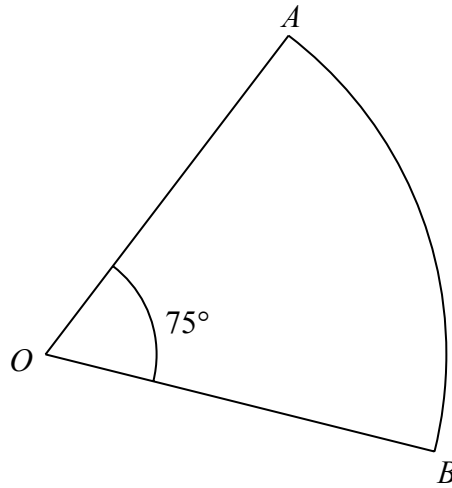


Diagram **NOT** accurately drawn

AOB is a sector of a circle, centre O , with $\angle AOB = 75^\circ$
The area of the sector is 200 cm^2

Find, to 3 significant figures,

(a) the radius, in cm, of the circle,

..... cm
(2)

(b) the length, in cm, of the perimeter of the sector.

..... cm
(3)

(Total for Question 22 is 5 marks)

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23 A student waits at a bus stop each day for the school bus.

Here are the number of minutes the student waited each day for nine days

6 4 11 9 4 5 6 5 4

(a) Write down the mode.

.....minutes
(1)

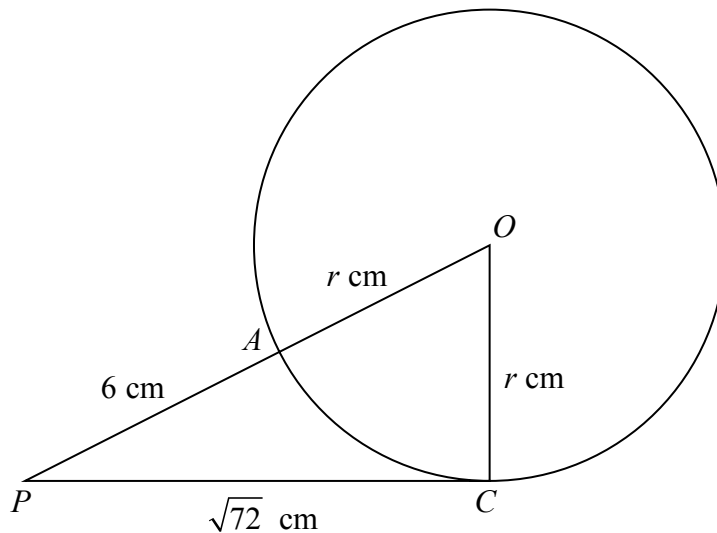
(b) Find the median.

.....minutes
(2)

(c) Work out the mean.

.....minutes
(2)

(Total for Question 23 is 5 marks)

Diagram **NOT**
accurately drawn

A and C are two points on the circumference of a circle centre O and radius r cm.

The point P is such that PC is a tangent to the circle and PAO is a straight line.

Given that $PC = \sqrt{72}$ cm and $PA = 6$ cm,

(a) write down an equation in r ,

.....
(1)

(b) find the value of r ,

$r =$
(2)

(c) find the size, in degrees to 3 significant figures, of $\angle OPC$.

.....
(2)

(Total for Question 24 is 5 marks)

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25 A rocket, R , is launched from horizontal ground.

The rocket moves vertically so that at time t seconds, the height, h metres, of R above the ground is given by

$$h = 90t + 14t^2 - t^3 \quad 0 \leq t \leq 18$$

At time t seconds, the velocity of R is v m/s.

(a) Find an expression for v in terms of t .

$$v = \dots\dots\dots (2)$$

(b) Find the time, in seconds, when R is instantaneously at rest.

Give your answer to 3 significant figures.

$$\dots\dots\dots \text{seconds} (4)$$

(Total for Question 25 is 6 marks)

26 (a) Use the factor theorem to show that $(2x + 3)$ is a factor of $2x^3 - 3x^2 - 17x - 12$

(2)

(b) Hence, factorise completely $2x^3 - 3x^2 - 17x - 12$

.....
(4)

(Total for Question 26 is 6 marks)

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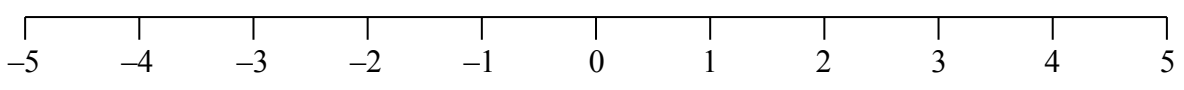
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27 (a) Solve the inequality $x^2 - x - 6 < 0$

.....
(4)

(b) On the number line below represent your answer to part (a).



(2)

(Total for Question 27 is 6 marks)

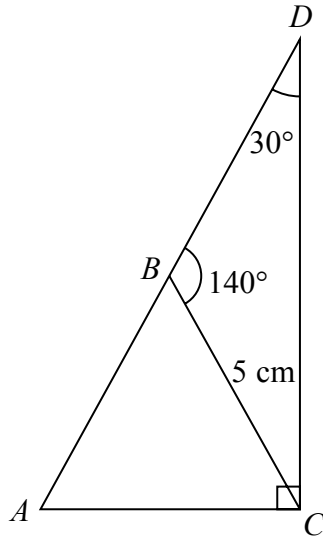


Diagram **NOT** accurately drawn

The diagram shows $\triangle BDC$ in which $BC = 5$ cm, $\angle BDC = 30^\circ$ and $\angle CBD = 140^\circ$

(a) Calculate the length, in cm to 3 significant figures, of DC .

.....cm
(3)

The line DB is extended to the point A so that the line AC is perpendicular to DC as shown in the diagram.

(b) Calculate the area, in cm^2 to 3 significant figures, of $\triangle ABC$.

.....cm
(4)

(Total for Question 28 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS

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