Write your name here

Surname	Other names

Pearson Edexcel International GCSE

Centre Number	Candidate Number

Mathematics B

Paper 1R

Monday 8 January 2018 – Morning
Time: 1 hour 30 minutes

Paper Reference
4MB0/01R

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 ▶

Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Factorise $2x^3 - 6xz + x^2z - 3z^2$

....

(Total for Question 1 is 2 marks)

2 Find the Highest Common Factor (HCF) of 126 and 612

....

(Total for Question 2 is 2 marks)

3 On a journey of 960 kilometres, David's car used 91 litres of petrol.

Given that 4.55 litres = 1 gallon, calculate the number of kilometres per gallon that David's car used on the journey.

.... kilometres per gallon

(Total for Question 3 is 2 marks)

4

Write down

(a) the number of lines of symmetry of the figure,

....
(1)

(b) the order of rotational symmetry of the figure.

....
(1)

(Total for Question 4 is 2 marks)

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5 The perimeter of a triangular field is 748 metres.

The lengths of the three sides of the field are in the ratios 2 : 7 : 8

Calculate the length, in metres, of the largest side of the field.

.... metres

(Total for Question 5 is 2 marks)

6

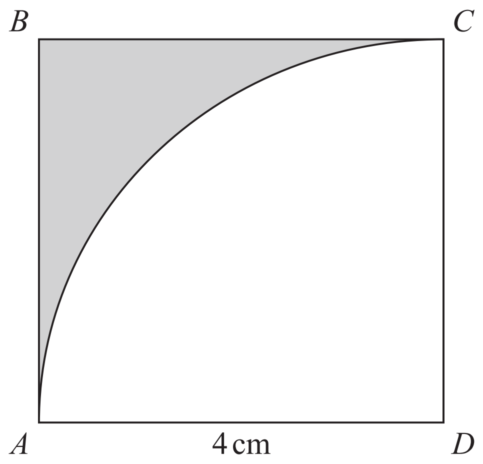

Diagram **NOT** accurately drawn

The diagram shows a square, *ABCD*, whose sides are 4 cm long. A quarter circle, of radius 4 cm and centre *D*, is drawn inside the square, as shown in the diagram.

Calculate the area, in cm^2 to 3 significant figures, of the shaded region in the diagram.

.... cm^2

(Total for Question 6 is 2 marks)

7 A regular polygon has 24 sides.

Find the size, in degrees, of each **exterior** angle.

.... °

(Total for Question 7 is 2 marks)

8 The nth term of a sequence is given by $100 - \frac{1}{2}n^2$

Calculate the difference between the 8th term and the 12th term of the sequence.

....

(Total for Question 8 is 2 marks)

9

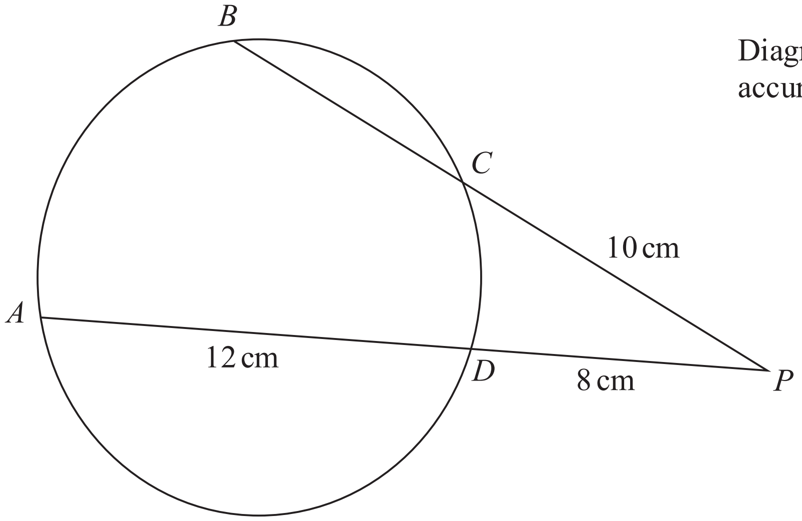

Diagram **NOT** accurately drawn

In the diagram, A, B, C and D are four points on the circle $ABCD$.
The point P lies outside the circle $ABCD$ so that BCP and ADP are straight lines.
$CP = 10$ cm, $AD = 12$ cm and $DP = 8$ cm.

Calculate the length, in cm, of BC.

.... cm

(Total for Question 9 is 2 marks)

10 Jason has a fair 6-sided dice, with faces numbered 1, 2, 3, 4, 5 and 6
He rolls the dice two times and records the number that the dice lands on each time.

Jason's score is the sum of the two numbers that he records.

Find the probability that Jason's score is 6

....

(Total for Question 10 is 3 marks)

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11 $$\overrightarrow{OX} = \begin{pmatrix} -4 \\ 2 \end{pmatrix} \quad \text{and} \quad \overrightarrow{YX} = \begin{pmatrix} -7 \\ 6 \end{pmatrix}$$

Calculate the modulus of $\overrightarrow{OY}$

....

(Total for Question 11 is 3 marks)

12

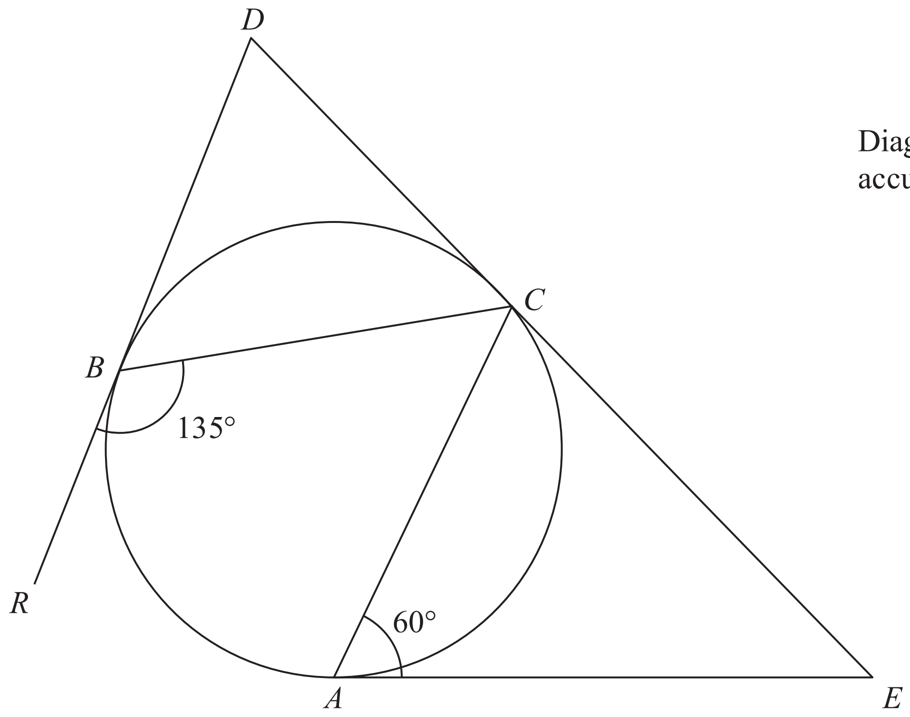

Diagram **NOT** accurately drawn

In the diagram, A, B and C are three points on the circle ABC.

AE is the tangent to the circle at the point A.
DCE is the tangent to the circle at the point C.
RBD is the tangent to the circle at the point B.
$\angle CAE = 60°$ and $\angle CBR = 135°$

Giving your reasons, find the size in degrees of $\angle ACB$.

....°

(Total for Question 12 is 3 marks)

13 Solve the equation $\sqrt{(4x^2 + 45)} = 3x$ where $x > 0$

$x =$ ....

(Total for Question 13 is 3 marks)

14 Here is a right-angled triangle.

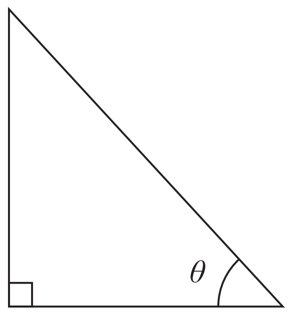

Diagram **NOT** accurately drawn

Given that $\tan\theta = \sqrt{8}$

express $3(\sin\theta + \cos\theta)$ in the form $m + \sqrt{n}$ where m and n are integers.

Show your working clearly.

....

(Total for Question 14 is 3 marks)

15 $\mathscr{E}$ = {positive multiples of 3 less than 50}
$A = \{x : x \geqslant 3\}$
$B = \{x : 0 < x < 18\}$

(a) List the members of the set $A \cap B$

....
(1)

C = {positive even multiples of three}

(b) Find $n([A \cap B] \cap C')$

....
(3)

(Total for Question 15 is 4 marks)

16

$$\mathbf{A} = \begin{pmatrix} 1 & -3 \\ -4 & 2 \end{pmatrix} \qquad \mathbf{B} = \begin{pmatrix} 3 & 4 \\ -2 & -5 \end{pmatrix}$$

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

$$\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$$
(2)

$$\mathbf{C} = \begin{pmatrix} 1 & 4 & 6 \\ 2 & 1 & -2 \end{pmatrix}$$

(b) Find $\mathbf{AC}$

$$\begin{pmatrix} \quad & \quad & \quad \\ \quad & \quad & \quad \end{pmatrix}$$
(2)

(Total for Question 16 is 4 marks)

17 $R = \frac{x}{y}$

Find the percentage increase in the value of R when the value of x increases by 5% and the value of y decreases by 25%

.... %

(Total for Question 17 is 4 marks)

18 Make y the subject of $\frac{w}{2} = \frac{x + 3y}{5y - 2x} + 1$

Show clear algebraic working.

....

(Total for Question 18 is 4 marks)

19 (a) Evaluate $\frac{5}{6} + \frac{2}{7} - \frac{4}{9}$

Give your answer as a fraction.

Show your working clearly.

....

(2)

(b) Give your answer to part (a) as a decimal to 3 significant figures.

....

(1)

(c) Give your answer to part (b) in standard form.

....

(1)

(Total for Question 19 is 4 marks)

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20 A particle P is moving along a straight line. At time t seconds, ($t \geqslant 1$), the displacement, s metres, of P from a fixed point O of the line is given by $s = t + \frac{4}{t}$

The particle comes to instantaneous rest at the point A.

(a) Find the value of t for which P is at A.

....

(3)

When $t = 8$, P is at the point B.

(b) Find, in metres, the distance AB.

.... metres

(2)

(Total for Question 20 is 5 marks)

21 550 people saw a film at a cinema.
Of these people, there were x adults and y children.

(a) Use this information to write down an equation in x and y.

....
(1)

The price of an adult ticket for the film was £22 and the price of a child ticket for the film was £12
50 children each received a £5 discount from the price of a child ticket.

The total income from all the tickets sold for the film was £8600

(b) Use this information to write down a second equation in x and y.

....
(1)

(c) Solve your equations to find the value of x and the value of y.

$x =$ ....

$y =$ ....
(3)

(Total for Question 21 is 5 marks)

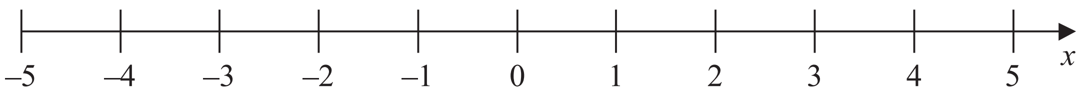
22 (a) Find the set of values of x for which

$$x - 8 < 4 + 5x \leqslant 10 + 2x$$

....

(3)

(b) Represent your solution set on the number line.



(2)

(Total for Question 22 is 5 marks)

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23 A curve C has the equation $y = 3x^3 - 15x^2$

(a) Find $\dfrac{dy}{dx}$

$\dfrac{dy}{dx} =$ ....

(2)

The tangent to the curve C at the point A has gradient –25

(b) Find the x coordinate of the point A.

$x =$ ....

(4)

(Total for Question 23 is 6 marks)

24

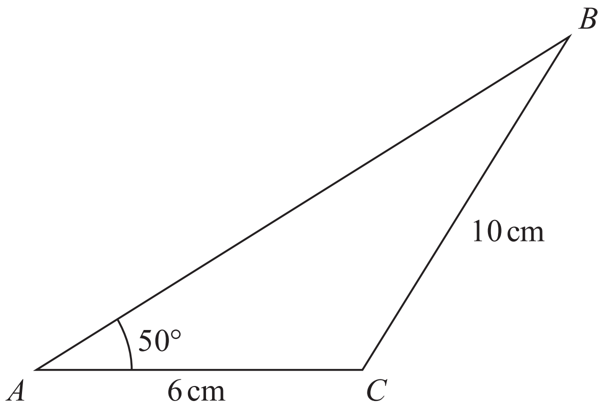


Diagram **NOT** accurately drawn

The diagram shows triangle ABC in which $AC = 6$ cm, $CB = 10$ cm and $\angle BAC = 50°$

Calculate, to 3 significant figures,

(a) the size, in degrees, of $\angle ABC$,

.... °

(3)

(b) the length, in cm, of AB.

.... cm

(3)

(Total for Question 24 is 6 marks)

25 Three taps, A, B and C, are used to fill a tank with water.
If each tap was opened to fill the tank on its own, then in 1 hour

Tap A would fill $\frac{1}{24}$ of the tank,

Tap B would fill $\frac{1}{48}$ of the tank,

Tap C would fill $\frac{1}{24x}$ of the tank.

All three taps are opened at exactly the same time and water flows into the tank from all three taps.

(a) Find and simplify an expression, in terms of x, for the fraction of the tank that is filled in 1 hour.

....
(2)

Given that the tank will fill completely with water in 15 hours,

(b) find the value of x.

x = ...
(4)

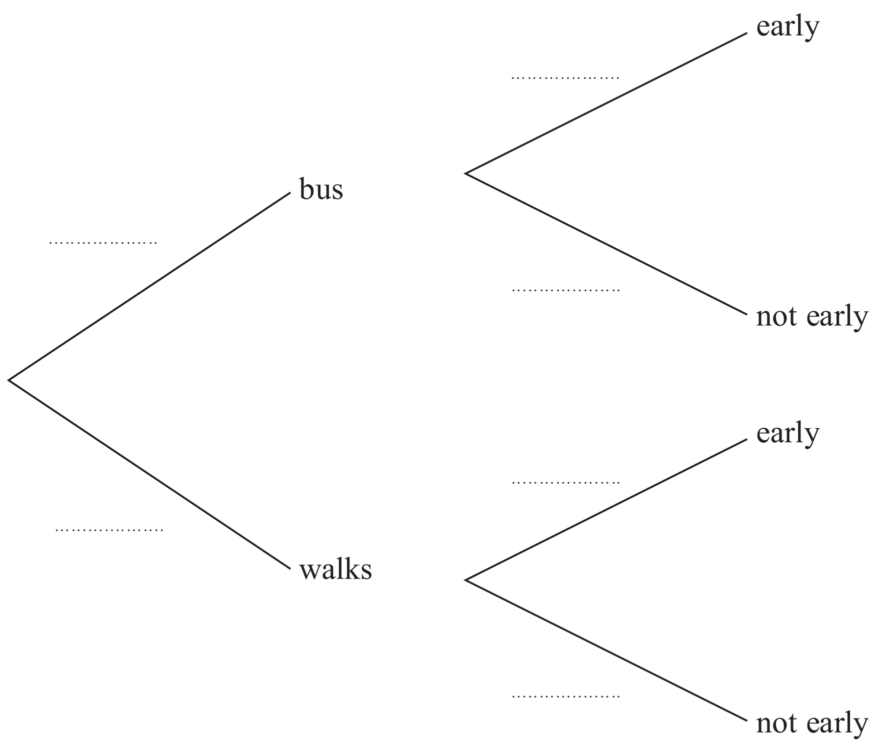
(Total for Question 25 is 6 marks)

26 On any day that Marian goes to school, she either goes by bus or walks.

The probability that she goes by bus is 0.7

If Marian goes by bus, the probability that she is early for school is 0.4
If Marian walks, the probability that she is early for school is 0.9

(a) Complete the probability tree diagram.



(2)

Find the probability that on any day Marian goes to school,

(b) she walks to school and is not early for school,

....
(2)

(c) she is early for school.

....
(3)

(Total for Question 26 is 7 marks)

27 A ship sailed 15 km from port A on a bearing of 200° to reach port B.
On leaving port B, the ship sailed 30 km on a bearing of 110° to reach port C.

(a) Calculate the direct distance, in km to one decimal place, between port A and port C.

.... km
(3)

(b) Calculate the bearing, in degrees to the nearest degree, of port A from port C.

....°

(4)

(Total for Question 27 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS

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