Write your name here

Surname	Other names

Pearson Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Paper 1R

Tuesday 6 January 2015 – Afternoon
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 ▶

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P 4 4 6 2 1 A 0 1 2 0

PEARSON

Answer ALL TWENTY NINE questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Solve $4(3 - x) - 5(5 - x) = 104$

$x =$ .....

(Total for Question 1 is 2 marks)

2 Find the gradient of the straight line whose equation is $3x - 2y = 12$

.....

(Total for Question 2 is 2 marks)

3

$$\left\{\sqrt{36},\ \frac{\pi}{5},\ \frac{5}{7},\ \sqrt[3]{9},\ \sqrt{\frac{121}{144}}\right\}$$

Write down the two elements in the above set which are irrational.

.....

(Total for Question 3 is 2 marks)

4 $\mathbf{a} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$

Find $2\mathbf{b} - \mathbf{a}$

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

(Total for Question 4 is 2 marks)

5 Triangle ABC is an isosceles triangle with $AB = AC$ and $\angle BAC = 38°$

Calculate the size, in degrees, of $\angle ABC$.

$\angle ABC =$ ..... °

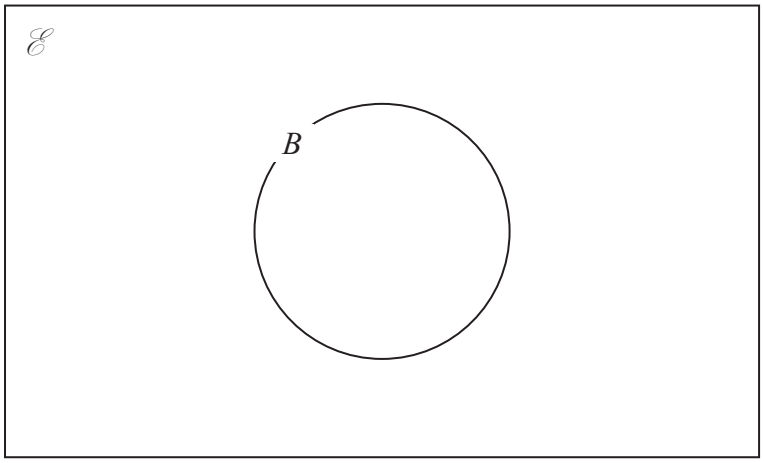
(Total for Question 5 is 2 marks)

6 Expand and simplify $(3x - 2y)(4y - 3x)$

.....

(Total for Question 6 is 2 marks)

7 A, B and C are three non-empty sets. In the diagram below the set B has been drawn.



Given that $A \subset B$, $A \cap B \cap C \neq \emptyset$ and $B' \cap C \neq \emptyset$, complete the Venn diagram to show the sets A and C.

(Total for Question 7 is 2 marks)

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8 On a clear day at sea, the distance, d km, to the horizon from an observer at a height of h metres above sea level is given by $d = \sqrt{12.7h}$
On a clear day, a crew member on a ship is at a height above sea level of 18 metres, acting as a lookout.

Find, to the nearest km, the distance to the horizon.

..... km

(Total for Question 8 is 2 marks)

9 (a) Calculate the exact value of $\dfrac{(27.25)^2 - (12.75)^2}{0.75 - 0.25}$

.....

(1)

(b) Write your answer to part (a) in standard form.

.....

(1)

(c) Write your answer to part (a) to 2 significant figures.

.....

(1)

(Total for Question 9 is 3 marks)

10 Express 270 m as a percentage of 30 km.

.....%

(Total for Question 10 is 3 marks)

11 $(x + 2)$ is a factor of $4x^3 + 8x^2 + kx - 18$

Find the value of k.

$k =$ .....

(Total for Question 11 is 3 marks)

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12 A pen costs 32 cents and a pencil costs 25 cents. Kwok buys x pens and y pencils.

Express each of the following statements as an inequality.

(a) Kwok buys at least 4 pencils.

.....

(1)

(b) Kwok buys more pens than pencils.

.....

(1)

(c) Kwok spends no more than 3.00 dollars.

.....

(1)

(Total for Question 12 is 3 marks)

13 Simplify fully $\dfrac{4x^2 - 28x + 40}{2x - 10}$

.....

(Total for Question 13 is 3 marks)

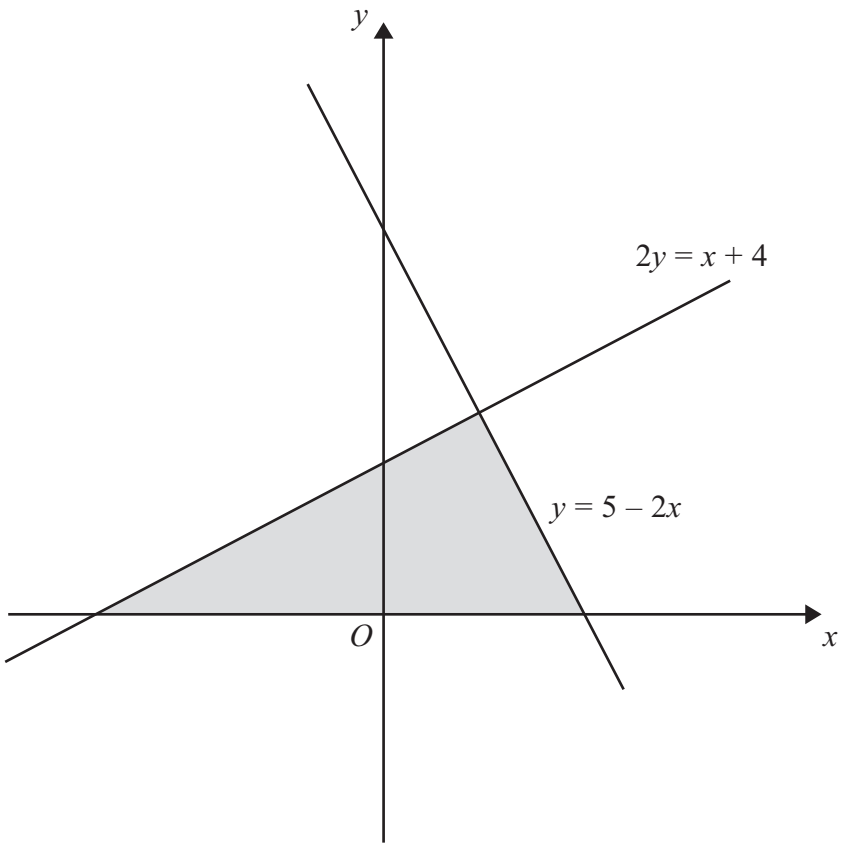
14 Each interior angle of a regular polygon is 150°

Calculate the number of sides of the polygon.

.....

(Total for Question 14 is 3 marks)

15



Write down the three inequalities that define the shaded region shown in the above diagram.

.....

.....

.....

(Total for Question 15 is 3 marks)

16 $\frac{x}{y} = \frac{5}{4}$

Find the value of

(a) $\frac{4x}{5y}$

.....

(1)

(b) $\frac{x - y}{x + y}$

.....

(2)

(Total for Question 16 is 3 marks)

17 Find the value of x when $4^{x-3} = 2^{6-x}$

$x =$ .....

(Total for Question 17 is 3 marks)

18

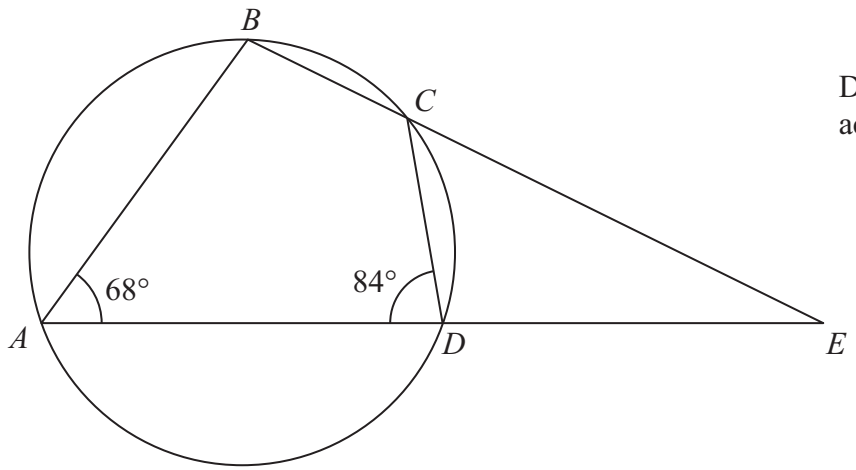


Diagram **NOT** accurately drawn

ABCD is a cyclic quadrilateral with $\angle BAD = 68°$ and $\angle ADC = 84°$
AD and *BC* are extended to meet at *E*.

Calculate, giving reasons, the size, in degrees, of $\angle DEC$.

$\angle DEC =$ ..... °

(Total for Question 18 is 3 marks)

Do NOT write in this space.

19 Here is a list of eight integers

11 19 15 3 13 7 22 x

The value of x is **three** times the median of these eight integers.

(a) Find the median.

median = ...

(2)

(b) Work out the numerical value of the mean of the eight integers.

mean = ...

(2)

(Total for Question 19 is 4 marks)

20 The number of ants in an ant hill is directly proportional to the cube of the height of the hill. There are 20 000 ants in a hill that is 20 cm high.

Find the number of ants in a hill that is 40 cm high.

.....

(Total for Question 20 is 4 marks)

21 Showing all your working, express $(5 + 2\sqrt{75})(3 - \sqrt{48})$ in the form $a + b\sqrt{c}$ where a, b and c are integers.

.....

(Total for Question 21 is 4 marks)

22 The diameter of each wheel of a bicycle is 66 cm. An Olympic cyclist rides the bicycle a distance of 45 km in one hour.
Calculate, to the nearest thousand, the number of revolutions made by one of the wheels in this hour.

.....

(Total for Question 22 is 4 marks)

23 Given that x is an integer, find all the values of x for which $2 \leqslant \frac{(3x - 2)}{4} \leqslant 5$

.....

(Total for Question 23 is 4 marks)

24

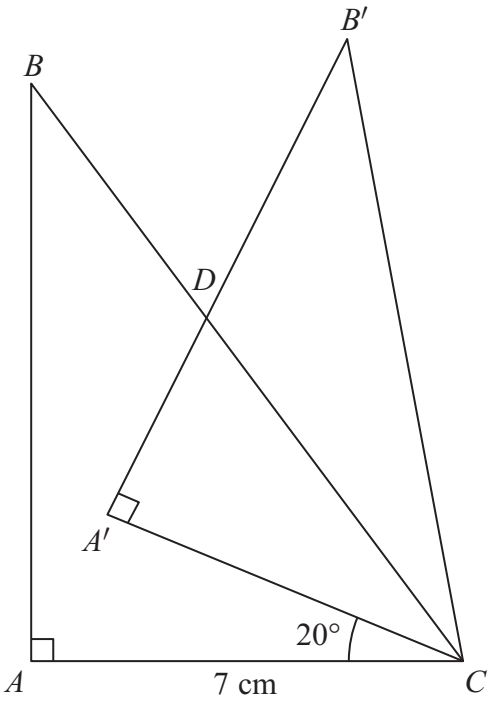


Diagram **NOT** accurately drawn

Triangle ABC is right-angled at A.
$AC = 7$ cm and $CB = 14$ cm.
Triangle ABC is rotated 20° clockwise about the point C to give triangle $A'B'C$.
The point D is the point of intersection of BC and $A'B'$.

Calculate, in cm^2 to 3 significant figures, the area of triangle CDB'.

..... cm^2

(Total for Question 24 is 5 marks)

25 $x = \dfrac{1 - t^2}{1 + t^2} \qquad t > 0$

Find t in terms of x.

$t =$ .....

(Total for Question 25 is 5 marks)

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26 The four internal angles of a quadrilateral are $x°$, $y°$, 75° and 116°, where $x > y$.

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

.....

(1)

The larger of the two unknown angles is 37° greater than the smaller of the two unknown angles.

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

.....

(1)

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

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

(3)

(Total for Question 26 is 5 marks)

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27

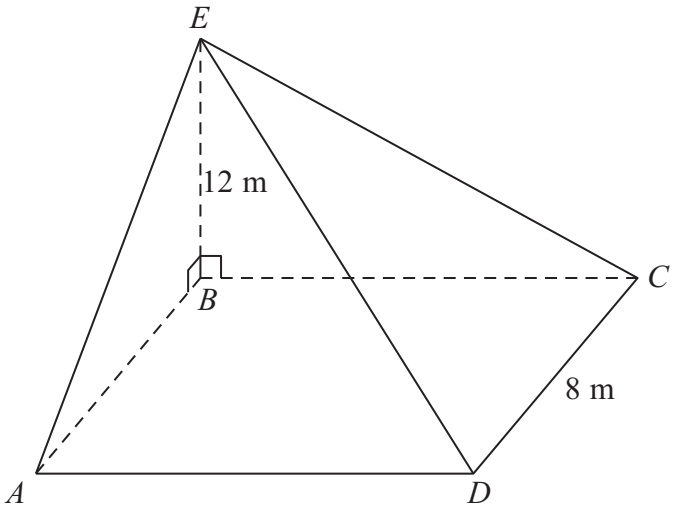

Diagram **NOT** accurately drawn

A pyramid on horizontal ground has a rectangular base $ABCD$.
The vertex E is vertically above the point B.
$DC = 8$ m and $BE = 12$ m.

(a) Calculate, in degrees to 3 significant figures, the angle of elevation of E from A.

..... °

(2)

The angle of elevation of E from D is 29°

(b) Calculate the length, in m to 3 significant figures, of AD.

..... m

(4)

(Total for Question 27 is 6 marks)

28 A bag contains 3 white balls, 4 blue balls and 2 red balls. Two balls are to be taken at random from the bag. The first ball is not replaced before the second one is taken. Find the probability that

(a) the first ball taken will be blue,

.....

(1)

(b) both balls taken will be blue,

.....

(2)

(c) both balls taken will be the same colour.

.....

(3)

(Total for Question 28 is 6 marks)

29

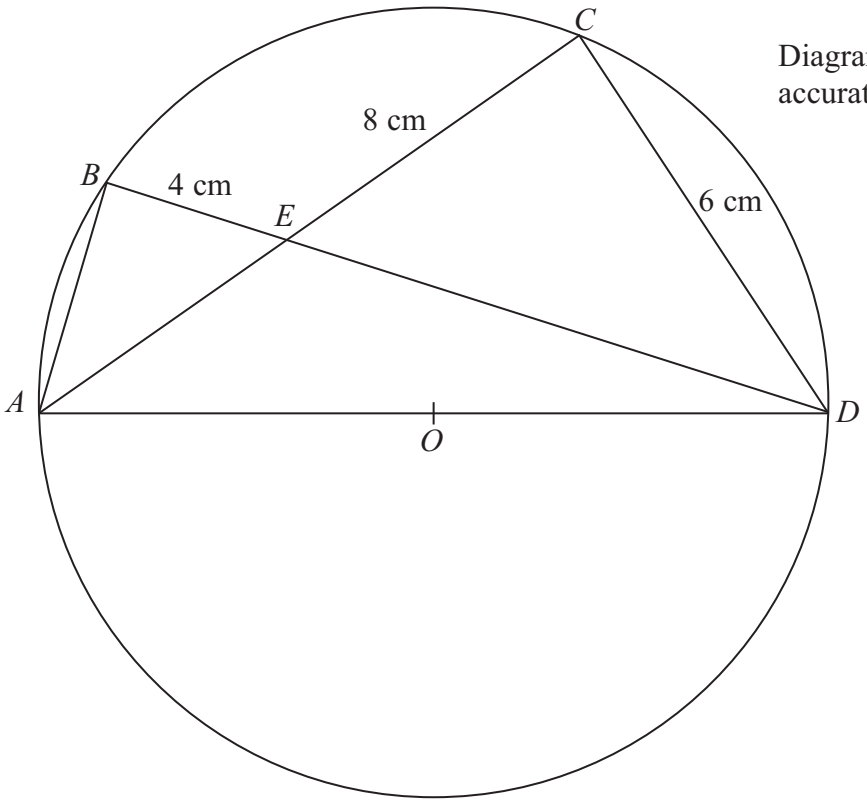

Diagram **NOT** accurately drawn

ABCD is a circle, centre *O*, with *AD* as a diameter. The straight lines *AC* and *BD* intersect at *E* and *BE* = 4 cm, *EC* = 8 cm and *CD* = 6 cm.

Calculate

(a) the length, in cm, of *ED*,

..... cm

(2)

(b) the length, in cm, of *AE*.

..... cm

(2)

(c) Write down the length, in cm, of AB.

..... cm

(1)

(d) Calculate the radius, in cm to 3 significant figures, of the circle.

..... cm

(2)

(Total for Question 29 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS

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