Write your name here

Surname	Other names

Pearson Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Paper 1R

Monday 9 January 2017 – 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 ▶

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P 4 8 4 1 1 A 0 1 2 4

Pearson

Answer ALL TWENTY NINE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1

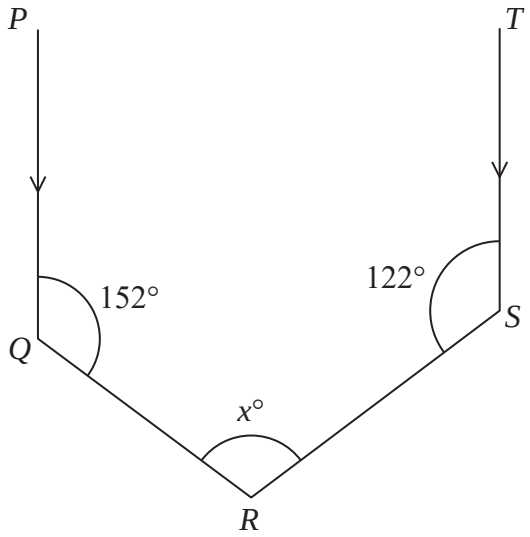


Diagram **NOT** accurately drawn

In the diagram, PQ is parallel to TS, $\angle PQR = 152°$, $\angle TSR = 122°$ and $\angle QRS = x°$

Find the value of x.

$x =$ .....

(Total for Question 1 is 2 marks)

2 Express 275 g as a fraction of 5.5 kg.
Give your answer in its simplest form.

.....

(Total for Question 2 is 2 marks)

3 Solve $\frac{2}{3}x - \frac{8}{15}x = \frac{16}{5}$

Show all your working clearly.

$x =$ .....

(Total for Question 3 is 2 marks)

4 Each time a music track was downloaded, the music company received £0.95

The music company gave $12\frac{1}{2}\%$ of the money received to the singer of the track.

The music track was downloaded 32 000 times in November.

Calculate how much, in £, was given to the singer by the music company for the November music track downloads.

£ .....

(Total for Question 4 is 2 marks)

5 The nth term of a sequence is given by the expression $5 - 3n$

Find the difference between the 7th term and the 12th term.

.....

(Total for Question 5 is 2 marks)

6 Factorise completely $xw - yw - yz + xz$

.....

(Total for Question 6 is 2 marks)

7 Given that $y = x^6 - \frac{6}{x^3}$

find $\frac{dy}{dx}$

.....

(Total for Question 7 is 2 marks)

8

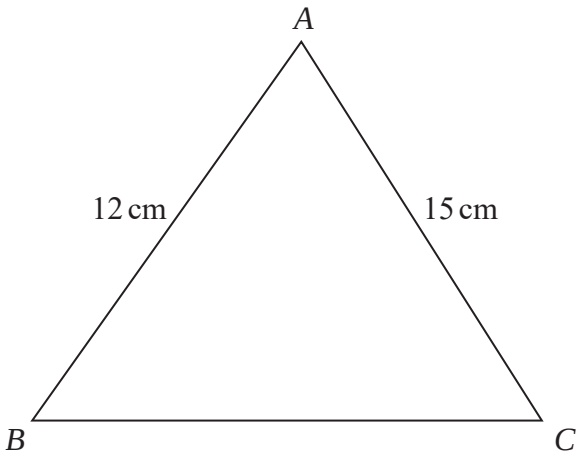


Diagram **NOT** accurately drawn

In triangle ABC, $AB = 12$ cm and $AC = 15$ cm.
The area of triangle ABC is $35\,\text{cm}^2$

Calculate the value of sin A

sin A = ...

(Total for Question 8 is 2 marks)

9 Showing all your working, evaluate $\dfrac{3^{-2} + 5^3}{3^{-2}}$

.....

(Total for Question 9 is 2 marks)

10 $t = \dfrac{2\cos p^\circ - 1}{\sqrt{q} - r}$

where $p = 30$, $q = 12\,288$ and $r = 64$

(a) Find the exact value of t.
Give your answer as a decimal.

$t =$ .....

(2)

(b) Write your answer to part (a) to 4 significant figures.

.....

(1)

(Total for Question 10 is 3 marks)

11 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{\text{odd numbers}\}$
$B = \{\text{multiples of 3}\}$
$C = \{\text{factors of 24}\}$

List the elements of the set

(a) A'

$A' = \{$.....$\}$

(1)

(b) $B \cup C$

$B \cup C = \{$.....$\}$

(1)

(c) $A' \cap (B \cup C)$

$A' \cap (B \cup C) = \{$.....$\}$

(1)

(Total for Question 11 is 3 marks)

12 Find the matrix product

(a) $(3 \quad -2)\begin{pmatrix} 1 \\ -4 \end{pmatrix}$

.....

(1)

(b) $\begin{pmatrix} 1 \\ -4 \end{pmatrix}(3 \quad -2)$

.....

(2)

(Total for Question 12 is 3 marks)

13 Simplify fully $\dfrac{6x^3 - 12x^2y}{4xy - 8y^2}$

.....

(Total for Question 13 is 3 marks)

14 Here are the mathematics test results of 12 students.

9 8 6 8 5 4 8 10 6 9 4 5

(a) Find the median mark.

.....

(2)

(b) Write down the modal mark.

.....

(1)

(Total for Question 14 is 3 marks)

15 Make y the subject of $4x - 5(y + 3) = wy$

.....

(Total for Question 15 is 3 marks)

16 (a) Write down **any** number a for which $\sqrt{a} > a$

$a =$ .....

(1)

(b) x is a positive number and $10\sqrt{x} = x\sqrt{40}$

Showing all your working, find the value of x.

$x =$ .....

(2)

(Total for Question 16 is 3 marks)

17 Solve $3x - 2y = 11$

$5x - 3y = 18$

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

(Total for Question 17 is 4 marks)

18 $a:b = 5:8$ and $b:c = 6:25$

Find, in its simplest form, $a:b:c$

$a:b:c =$ .....

(Total for Question 18 is 3 marks)

19

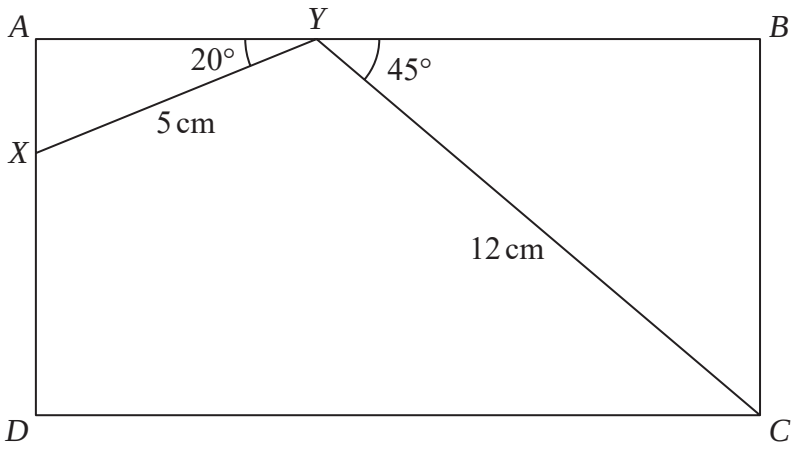


Diagram **NOT** accurately drawn

ABCD is a rectangle.
X is the point on *AD* and *Y* is the point on *AB* such that
$XY = 5$ cm, $YC = 12$ cm, $\angle BYC = 45°$ and $\angle AYX = 20°$

Find the length, in cm to 3 significant figures, of

(a) *BC*,

$BC =$ ..... cm

(2)

(b) *AB*.

$AB =$ ..... cm

(2)

(Total for Question 19 is 4 marks)

20 A biased six-sided die is numbered 1, 2, 3, 4, 5 and 6.

The table shows the probability of each possible score when the die is rolled once.

Score	1	2	3	4	5	6
Probability	0.2	0.1	x	0.15	0.3	0.1

(a) Find the value of x.

$x =$ .....

(1)

The die is to be rolled twice.

(b) Find the probability that the sum of the scores for the two rolls is 10.

.....

(3)

(Total for Question 20 is 4 marks)

21 (a) Express 729 as a power of 3

.....

(1)

(b) Hence solve $3^{2x+5} = 729^{5-x}$

Show your working clearly.

$x =$ .....

(3)

(Total for Question 21 is 4 marks)

22 Each day, Sania recorded the maximum wind speed, in km/h, in her town for a period of 60 days. On no day was the maximum wind speed greater than 60 km/h.

The incomplete table and histogram give information about the maximum wind speeds.

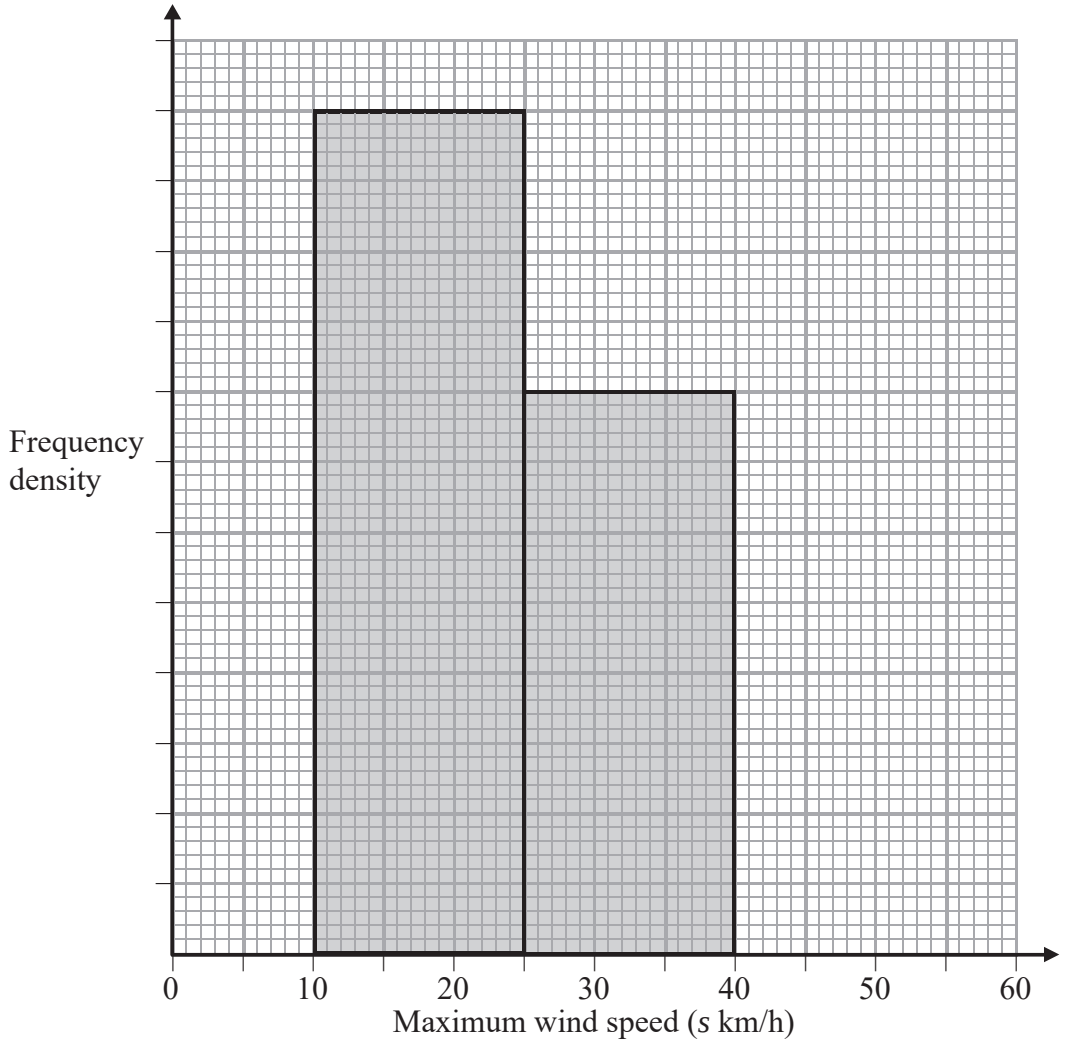
Using this information

(a) complete the table,

Maximum wind speed (s km/h)	Number of days
$0 < s \leqslant 10$	8
$10 < s \leqslant 25$	24
$25 < s \leqslant 40$	
$40 < s \leqslant 60$	

(2)

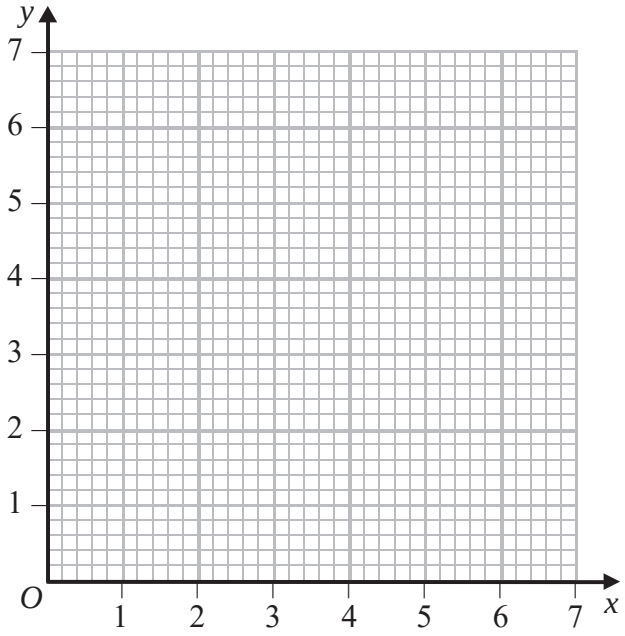
(b) complete the histogram.



(2)

(Total for Question 22 is 4 marks)

23



(a) On the grid, draw and label the lines with equation

(i) $y = 5$

(ii) $x + y = 6$

(iii) $2y = x + 1$

(3)

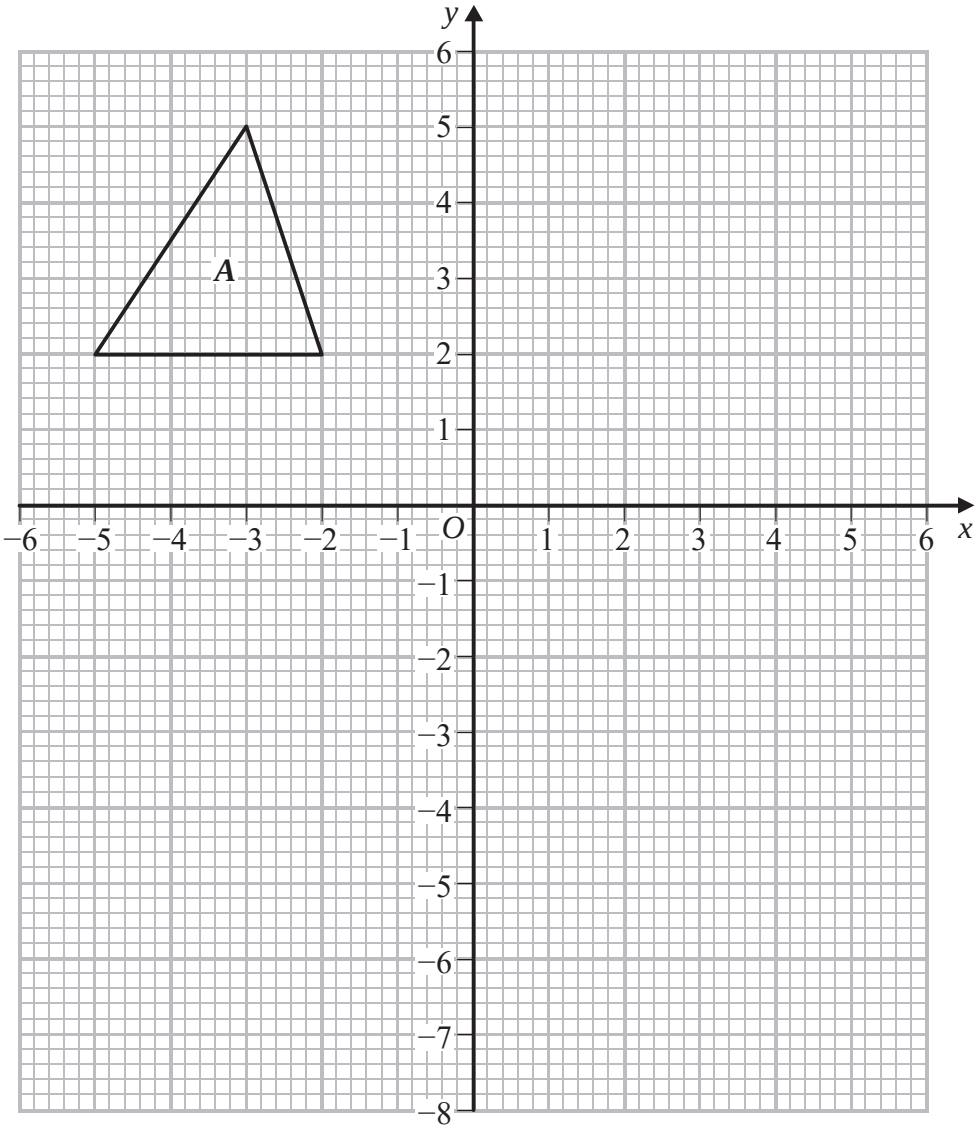
(b) On the grid, shade and label the region **R** defined by

$x \geqslant 0$ and $y \leqslant 5$ and $x + y \leqslant 6$ and $2y \geqslant x + 1$

(1)

(Total for Question 23 is 4 marks)

24



Triangle B is the image of triangle $\boldsymbol{A}$ under a reflection in the x-axis.

(a) On the grid, draw and label triangle B.

(1)

Triangle C is the image of triangle B under the translation $\begin{pmatrix} 7 \\ -2 \end{pmatrix}$

(b) On the grid, draw and label triangle C.

(1)

Triangle D is the image of triangle C under a rotation of 180° about the point (3.5, −1)

(c) On the grid, draw and label triangle D.

(1)

(d) Find the 2 × 2 matrix that represents the transformation of triangle D onto triangle A.

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

(2)

(Total for Question 24 is 5 marks)

25 y varies directly as the cube of x.

$y = 9$ when $x = \frac{1}{2}$

(a) Find a formula for y in terms of x.

$y =$ .....

(3)

(b) Find the value of x when $y = \frac{125}{3}$

$x =$ .....

(2)

(Total for Question 25 is 5 marks)

26

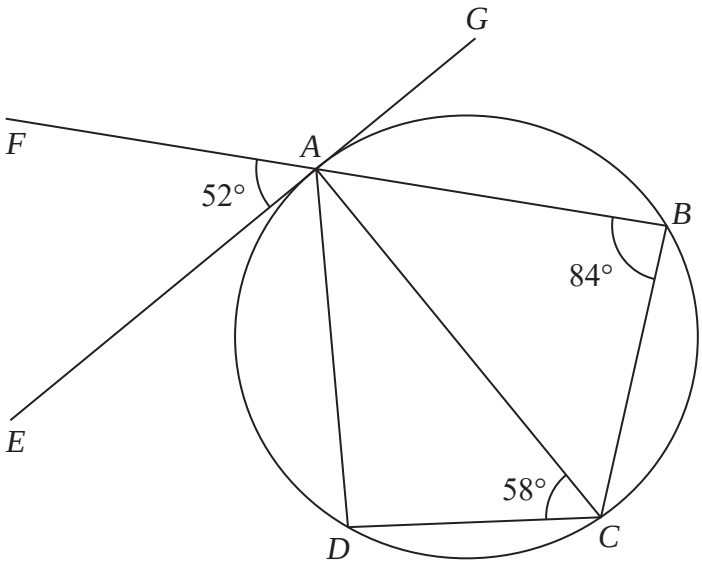


Diagram **NOT** accurately drawn

In the diagram, A, B, C and D are points on the circumference of a circle. FAB is a straight line and EAG is the tangent to the circle at the point A.

$\angle ABC = 84°$, $\angle ACD = 58°$ and $\angle EAF = 52°$

Giving your reasons, calculate the size, in degrees, of

(a) $\angle ADC$,

$\angle ADC =$ ..... °

(2)

(b) $\angle EAD$,

$\angle EAD =$ ..... °

(2)

(c) $\angle ACB$.

$\angle ACB =$ ..... °

(2)

(Total for Question 26 is 6 marks)

Do NOT write in this space

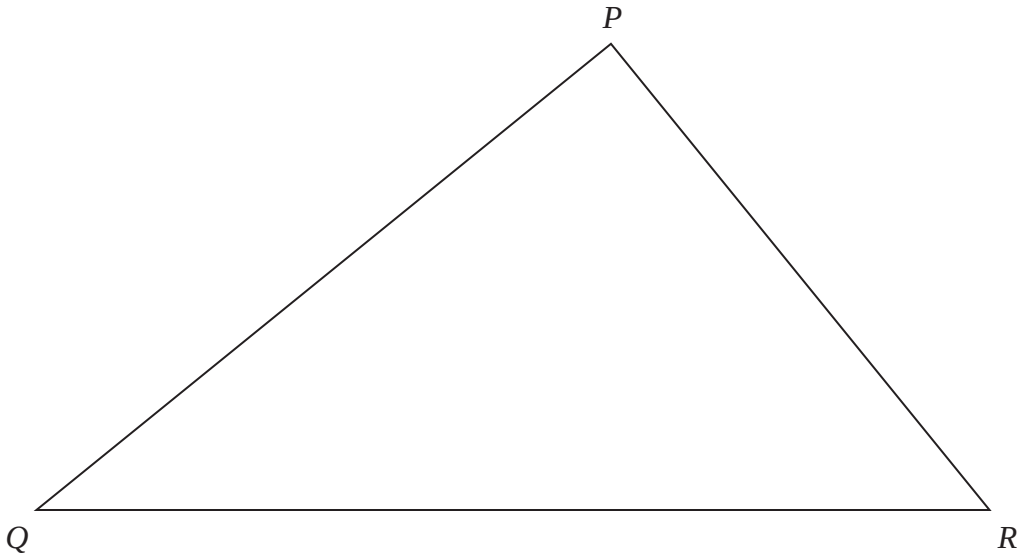
Turn over for Question 27

27 Find the values of x which satisfy $\quad x + \dfrac{1}{x-2} = \dfrac{9}{2}$

.....

(Total for Question 27 is 5 marks)

28



PQR is a triangle.

Leaving in all of your construction lines, construct the locus of all points inside the triangle which are

(a) 6 cm from *P*,

(1)

(b) equidistant from *Q* and *R*,

(2)

(c) equidistant from the lines *QP* and *QR*.

(2)

The region **T** consists of all the points inside the triangle which are less than 6 cm from *P*, closer to *R* than to *Q* and closer to *QR* than to *QP*.

(d) Show, by shading, the region **T**. Label the region **T**.

(1)

(Total for Question 28 is 6 marks)

Turn over for Question 29

29

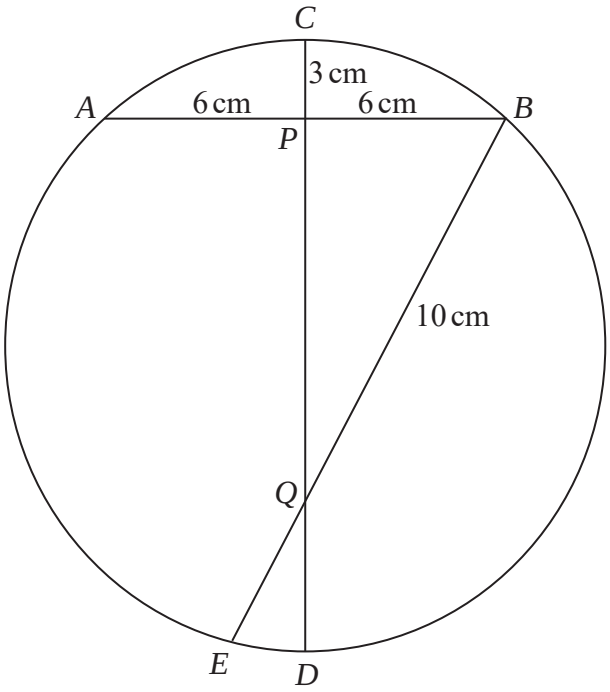


Diagram **NOT** accurately drawn

A, *B*, *C*, *D* and *E* are points on the circumference of a circle with diameter *CD*.

The chord *AB* of the circle intersects the diameter *CD* at *P* such that $AP = PB = 6$ cm and $PC = 3$ cm.
The chord *BE* of the circle intersects the diameter at *Q* and $BQ = 10$ cm.

(a) Find the length, in cm, of *PQ*.

PQ = ... cm

(2)

(b) Find the radius, in cm, of the circle.

..... cm

(3)

(c) Find the length, in cm, of QE.

$QE =$ ..... cm

(2)

(Total for Question 29 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS

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