Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Tuesday 19 May 2020

Morning (Time: 1 hour 30 minutes) | Paper Reference **4MB1/01R**

Mathematics B

Paper 1R

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**.

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 6 2 0 1 8 A 0 1 2 4

Pearson

Answer ALL TWENTY SIX questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Ali, Beth and Chari pay rent on a piece of woodland.
The annual rent that they pay is such that

the amount Ali pays : the amount Beth pays : the amount Chari pays = 13 : 8 : 11

The amount that Chari pays = $2563

Calculate how much more rent Ali pays than Beth pays.

$ .....

(Total for Question 1 is 2 marks)

2 Simplify fully $\frac{8(2x+3)^2}{8x+12}$

.....

(Total for Question 2 is 2 marks)

3 Without using a calculator and showing all your working, evaluate

$$5\frac{1}{3} \div 2\frac{3}{5}$$

Give your answer as a mixed number in its simplest form.

.....

(Total for Question 3 is 3 marks)

4 Ashley takes 3 hours and 36 minutes to walk around a lake.
The distance she walks is 11 520 m.

Calculate Ashley's average speed.
Give your answer in kilometres per hour.

..... kilometres per hour

(Total for Question 4 is 3 marks)

5 Liam started a new job on a salary of $45 500

At the end of 1 year he is given a pay increase of 5.5%
At the end of each subsequent year he is given a pay increase of 1.25%

Calculate, to the nearest $, Liam's salary at the end of 3 years after he started the job.

$ .....

(Total for Question 5 is 3 marks)

6 The straight line **L** has equation $2y - 5 = 3x$

(a) Find the gradient of **L**

.....

(2)

(b) Find the coordinates of the point where **L** meets the y-axis.

(..... , ...)

(1)

(Total for Question 6 is 3 marks)

7 Arthur has 10 cards.
Each card has a letter on it and the letters spell the word **PICCADILLY**

P	I	C	C	A	D	I	L	L	Y

Arthur selects at random 3 of these cards.

Calculate the probability that he selects **P** **A** **L** in that order.

.....

(Total for Question 7 is 3 marks)

8 Without using a calculator and showing all your working, solve the inequality

$$6x^2 - x - 12 > 0$$

.....

(Total for Question 8 is 3 marks)

9 The function f is defined by

$$f : x \mapsto \frac{3x}{2(x+2)} \qquad x \neq -2$$

Express the inverse function f^{-1} in the form $f^{-1} : x \mapsto ...$

$f^{-1} : x \mapsto$ .....

(Total for Question 9 is 3 marks)

10 Without using a calculator and showing all your working, express $\dfrac{6-\sqrt{8}}{2+\sqrt{8}}$ in the form $a + \sqrt{b}$ where a and b are integers.

.....

(Total for Question 10 is 3 marks)

11 Given that $-3x^2 + 6x + 2$ can be written in the form $a(x + b)^2 + c$ where a, b and c are integers, find the value of a, the value of b and the value of c.

$a =$ .....

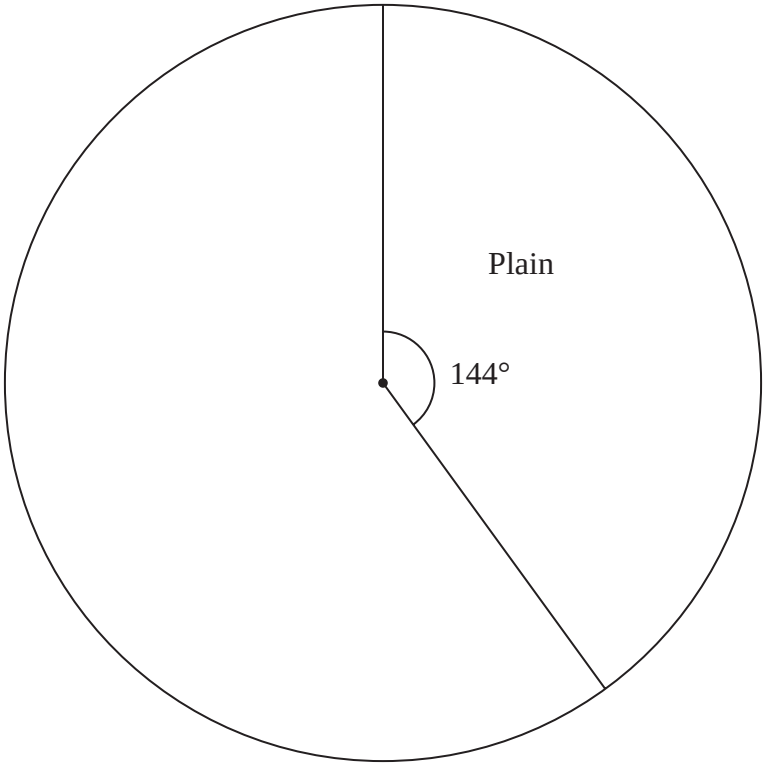
$b =$ .....

$c =$ .....

(Total for Question 11 is 3 marks)

12 The incomplete table and pie chart below show information about the favourite type of chocolate of 440 adults.

Type of chocolate	Number of adults
Milk	209
Plain	.....
White	.....
Total	440



Complete the table and the pie chart.

(Total for Question 12 is 4 marks)

13 Here is information about the age, in years, of each of Jelina's five children when written in order.

$$a \qquad b \qquad \frac{b}{2} + a \qquad 2b + a + 3 \qquad 2b + a + 5$$

It is given that

a is the age of the youngest child

$a \neq b$

two of the children have the same age

the mean age of the five children is 10.6 years

Calculate the value of a and the value of b

Show clear algebraic working.

$a =$ .....

$b =$ .....

(Total for Question 13 is 4 marks)

14

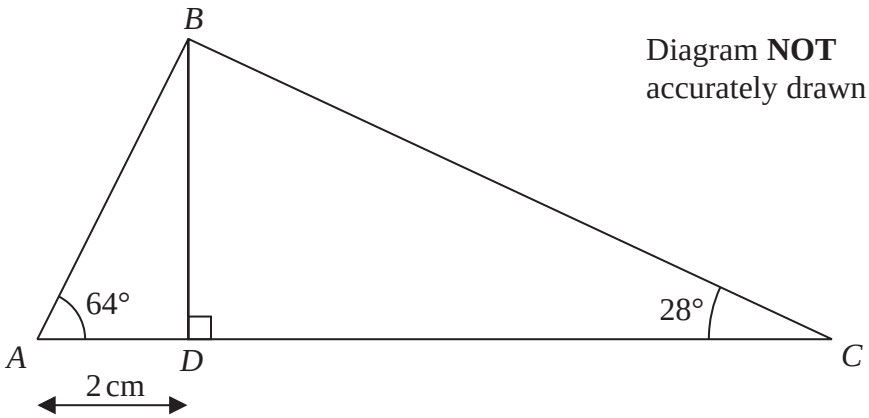


Diagram **NOT** accurately drawn

The diagram shows a triangle *ABC*.

The point *D* lies on *AC* so that *BD* is perpendicular to *AC*.

$\angle BAD = 64°$
$\angle ACB = 28°$
$AD = 2\,\text{cm}$

Calculate the length, in cm to one decimal place, of *BC*.

..... cm

(Total for Question 14 is 4 marks)

15 (a) $\mathbf{A} = \begin{pmatrix} 3 & -1 \\ -4 & 2 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} 2 & -\frac{1}{2} \\ 2 & -2 \end{pmatrix}$

Calculate $3\mathbf{A} - 2\mathbf{B}$

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

(2)

(b) $\mathbf{P} = \begin{pmatrix} 5 & -3 \\ -3 & 2 \end{pmatrix}$ $\mathbf{QP}^{-1} = \begin{pmatrix} 0 & 1 \\ -10 & -17 \end{pmatrix}$

Find the matrix $\mathbf{Q}$

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

(2)

(Total for Question 15 is 4 marks)

16

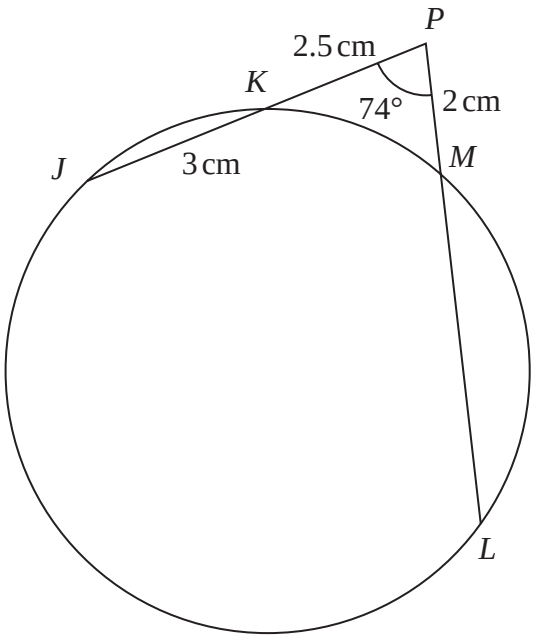


Diagram **NOT** accurately drawn

The diagram shows a circle *JKML*.

JKP and *LMP* are straight lines.
JK = 3 cm, *KP* = 2.5 cm and *PM* = 2 cm.
$\angle JPL = 74°$

Calculate the area, in cm^2 to 2 decimal places, of triangle *LKP*.

..... cm^2

(Total for Question 16 is 4 marks)

17 (a) Write 0.0234 in standard form.

.....

(1)

(b) Write 2.40×10^5 as an ordinary number.

.....

(1)

(c) Calculate, giving your answer in standard form

$$\frac{2.5 \times 10^{101}}{5 \times 10^{-98}}$$

Show your working clearly.

.....

(2)

(Total for Question 17 is 4 marks)

18 (a) Simplify $3w^7y^{-3} \times 4w^2y^3$

.....

(2)

(b) Simplify $(25x^4)^{\frac{3}{2}}$

.....

(2)

(Total for Question 18 is 4 marks)

19

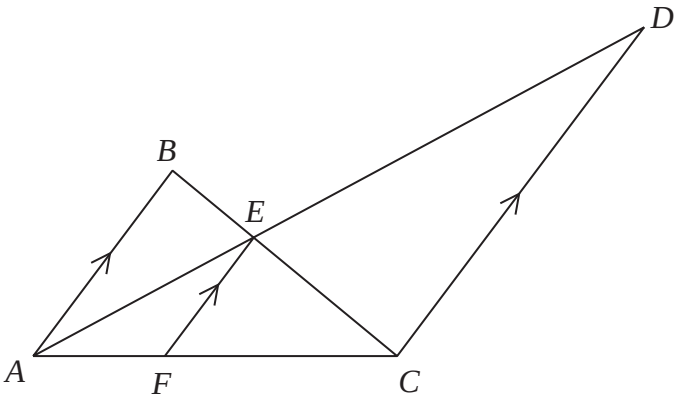


Diagram **NOT** accurately drawn

The diagram shows triangle *ABC* and triangle *ADC*.

E is the point on *BC* and *AD*.
F is the point on *AC* such that *AB*, *FE* and *CD* are parallel.

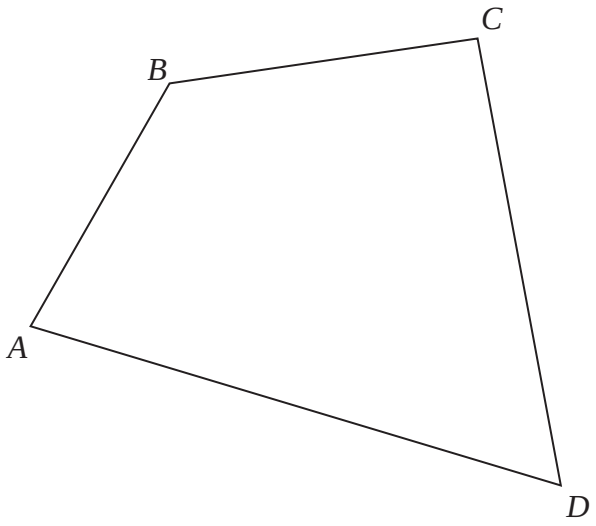
Given that *AB* = 3 cm and that *CD* = 7 cm,

calculate the length of *FE*.

..... cm

(Total for Question 19 is 5 marks)

20



The diagram shows quadrilateral *ABCD*.

The region **R** consists of all the points inside the quadrilateral that are

(i) closer to *DA* than to *DC*,

(ii) less than 3 cm from the side *DC*,

(iii) more than 4 cm from *B*.

Using ruler and compasses only and **showing all your construction lines**, construct and show, by shading, the region **R**.
Label the region **R**.

(Total for Question 20 is 5 marks)

21

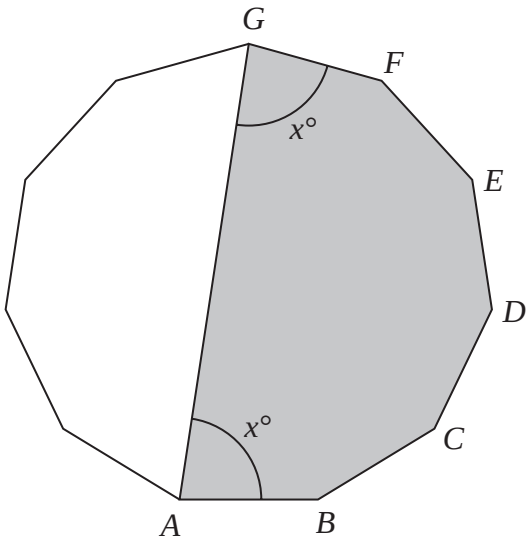


Diagram **NOT** accurately drawn

The diagram shows a shaded 7-sided shape *ABCDEFG*.
The points *A*, *B*, *C*, *D*, *E*, *F* and *G* are 7 vertices of a regular polygon with 11 sides.

$\angle GAB = \angle AGF = x°$

Calculate the value, to 3 significant figures, of x.
Show your working clearly.

$x =$ .....

(Total for Question 21 is 5 marks)

22

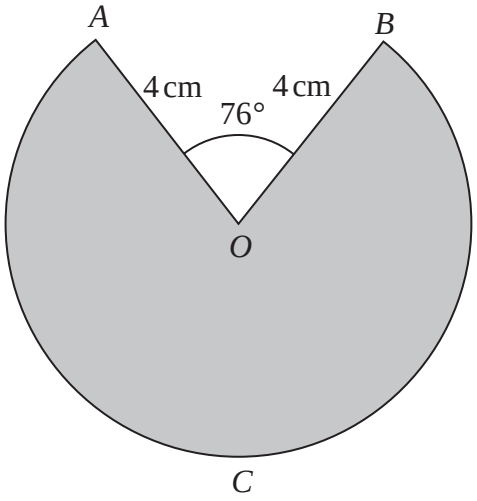


Diagram **NOT** accurately drawn

The diagram shows a sector $OACB$ of a circle, centre O.

$OA = OB = 4$ cm
Angle $AOB = 76°$

(a) Calculate the area, in cm^2 to 3 significant figures, of the shaded sector $OACB$.

.....cm^2

(2)

(b) Calculate the perimeter, in cm to 3 significant figures, of the shaded sector $OACB$.

.....cm

(3)

(Total for Question 22 is 5 marks)

23 y is directly proportional to x^3
x is inversely proportional to the square root of w.

$y = 729$ when $x = 4.5$
$x = 25$ when $w = 0.16$

Find a formula for y in terms of w.

.....

(Total for Question 23 is 5 marks)

24 $(2x + 1)$, $(10x – 10)$ and $(35x – 5)$ are the first three terms of a sequence.

The first term of the sequence is $(2x + 1)$ where $(2x + 1) \neq 0$

After the first term, all other terms of the sequence are found by using the rule

'multiply the previous term by d'

Given that x is an integer,

find the value of d.

$d =$ .....

(Total for Question 24 is 5 marks)

25

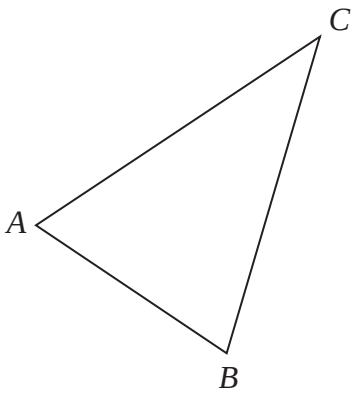


Diagram **NOT** accurately drawn

ABC is a triangle.

$\overrightarrow{AB} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$ $\overrightarrow{BC} = \begin{pmatrix} x \\ 5x \end{pmatrix}$ where $x > 0$ and $|\overrightarrow{AC}| = 5$

Find $\overrightarrow{AC}$ as a column vector.
Show clear algebraic working.

(Total for Question 25 is 5 marks)

26 A small ball is thrown into the air from a point that is 1 m above horizontal ground.

The ball moves vertically upwards so that at time t seconds after the ball was thrown, the height, h metres, of the ball above the ground is given by

$$h = 1 + kt - 5t^2 \qquad \text{where } k \text{ is a constant.}$$

At time t seconds after the ball was thrown, the velocity of the ball is v m/s.

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

.....

(1)

Given that the total distance travelled by the ball between the instant when the ball is thrown and when it hits the ground for the first time is 161 m,

(b) calculate the value of k.

(5)

$k =$ .....

(Total for Question 26 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS

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