Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | Candidate Number

Monday 7 January 2019

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

Mathematics B

Paper 1R

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 6 0 7 9 4 A 0 1 2 4

Pearson

Answer ALL TWENTY EIGHT questions.

Write your answers in the spaces provided.

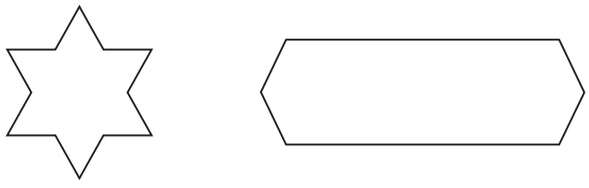
You must write down all the stages in your working.

1 Express 15 centimetres as a percentage of 3 metres.

%

(Total for Question 1 is 2 marks)

2



A **B**

The diagram shows shape **A** and shape **B**.

Write down,

(a) the number of lines of symmetry of shape **A**,

(1)

(b) the order of rotational symmetry of shape **B**.

(1)

(Total for Question 2 is 2 marks)

3 The bearing of ship P from ship Q is 057°

Find the bearing of ship Q from ship P.

°

(Total for Question 3 is 2 marks)

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

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

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

(Total for Question 4 is 2 marks)

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

$$2\frac{1}{4} \times 2\frac{2}{3}$$

Give your answer in its simplest form.

(Total for Question 5 is 2 marks)

6 Given that $y = 7x^2 - \frac{3}{x}$

find $\frac{\mathrm{d}y}{\mathrm{d}x}$

$\frac{\mathrm{d}y}{\mathrm{d}x} =$

(Total for Question 6 is 2 marks)

7 Here are the first 4 terms of a sequence.

4096 −1024 256 −64

(i) Write down the next 2 terms of the sequence.

,

(ii) Explain how you found your answer.

(Total for Question 7 is 3 marks)

8 Ying has 4 black counters and 3 white counters.
There is a number on each counter.
The mean of the numbers on the black counters is 11.5
The mean of the numbers on the white counters is 9

Calculate the mean, to 3 significant figures, of the numbers on all 7 counters.

(Total for Question 8 is 3 marks)

9 Find the largest integer value of x such that $17 - 2x \geqslant 4(x - 5)$
Show clear algebraic working.

(Total for Question 9 is 3 marks)

10 A regular polygon has n sides.
Each interior angle of the regular polygon is 135° **greater** than each exterior angle of the polygon.

Find the value of n.

$n =$

(Total for Question 10 is 3 marks)

11 A piece of ribbon 9 metres long is cut into 3 parts in the ratios $3:5:7$ by length.

Calculate the length, in metres, of the longest piece.

m

(Total for Question 11 is 3 marks)

12 (a) Write 9.6×10^{-7} as an ordinary number.

(1)

(b) Calculate $\dfrac{2.4 \times 10^{199}}{9.6 \times 10^{-7}}$

Give your answer in standard form.

(2)

(Total for Question 12 is 3 marks)

13 Without using a calculator and showing all your working, express

$$\sqrt{605} - \sqrt{80}$$

in the form $\sqrt{n}$ where n is an integer.

(Total for Question 13 is 3 marks)

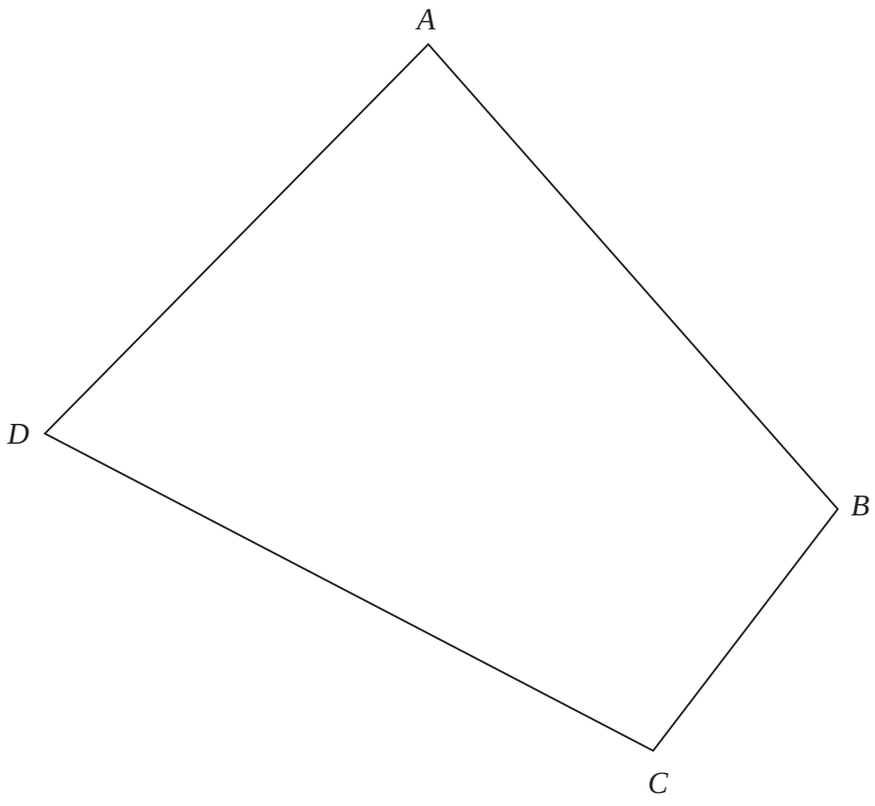
14 Solve the equation

$$5x^2 = 7 - 9x$$

Give your solutions to 3 significant figures.
Show your working clearly.

(Total for Question 14 is 3 marks)

15



The diagram shows quadrilateral *ABCD*.

The point *P* lies inside the quadrilateral, such that *P* is 5.5 cm from *C* **and** equidistant from *AD* and *AB*.

Using ruler and compasses only and **showing all your construction lines**, show the point *P* on the diagram.

(Total for Question 15 is 4 marks)

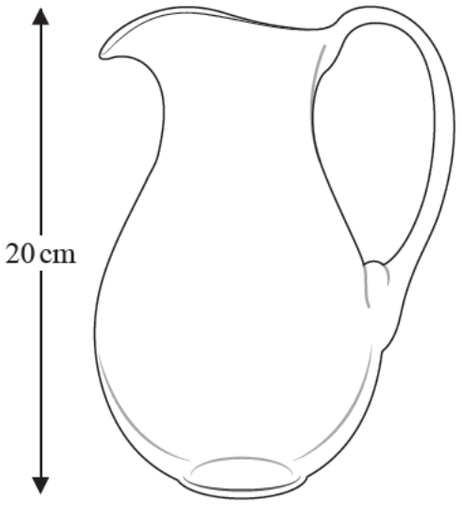
16 t varies inversely as the square of a where $a > 0$
$t = 14$ when $a = 5$

Calculate the value of a when $t = 224$

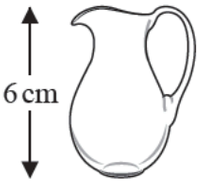
$a =$

(Total for Question 16 is 4 marks)

17



A



B

Diagram **NOT** accurately drawn

The diagram shows two similar jugs.

The height of jug **A** is 20 cm and the height of jug **B** is 6 cm.

Given that

volume of jug **A** − volume of jug **B** = 1459.5 cm^3

calculate the volume, in cm^3, of jug **B**.

cm^3

(Total for Question 17 is 4 marks)

18 $\mathscr{E}$ = {positive integers from 1 to 15 inclusive}
A = {multiples of 3}
B = {even numbers}

(a) Find $A \cup B$

$A \cup B = \{$ $\}$

(1)

(b) (i) Find $A \cap B$

$A \cap B = \{$ $\}$

(1)

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

$n([A \cap B]') =$

(1)

The set C has 8 elements and $B \cap C = \varnothing$

(c) Write down the elements of set C.

$C = \{$ $\}$

(1)

(Total for Question 18 is 4 marks)

19 Solve the simultaneous equations

$$10x + 2y = 17$$
$$15x - 3y = 39$$

$x =$, $y =$

(Total for Question 19 is 4 marks)

20 The coordinates of point A are (7, 2) and the coordinates of point B are $(-5, y)$.

The modulus of the vector $\overrightarrow{AB}$ is 13

Calculate the possible values of y.

$y =$

(Total for Question 20 is 4 marks)

21 The straight line joining the points with coordinates $(-a, -22)$ and $(3a, 38)$ has equation $y = mx + a$

Calculate the value of a and the value of m.

$a =$

$m =$

(Total for Question 21 is 4 marks)

22

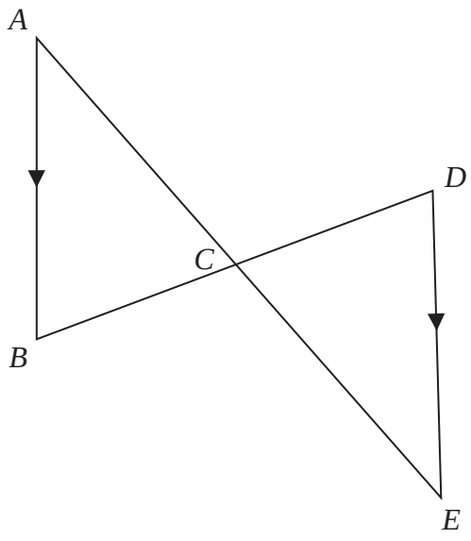


Diagram **NOT** accurately drawn

In the diagram *ACE* and *BCD* are straight lines such that the point *C* is the midpoint of *BD*.

AB is parallel to *DE*.

Prove that the triangles *ABC* and *EDC* are congruent.

(Total for Question 22 is 4 marks)

23 A right circular cone has a curved surface area of $136\pi\,\text{cm}^2$
The radius of the base of the cone is 8 cm
The volume of the cone is $k\pi\,\text{cm}^3$

Find the value of k.

$k =$

(Total for Question 23 is 4 marks)

24 Solve $3 - \dfrac{x+1}{2x^2+9x-5} - \dfrac{2x-1}{x+5} = 1$

Show clear algebraic working.

$x =$

(Total for Question 24 is 4 marks)

25 There are 20 counters in a bag.
There are 7 red counters.
The rest of the counters are green or white.

Bernard takes at random 2 counters from the bag.

The probability that Bernard will take 2 white counters is $\frac{1}{19}$

Calculate the probability that Bernard will take 1 green counter and 1 white counter.

(Total for Question 25 is 5 marks)

26 The table below gives information about the lengths of time that 50 people have been waiting for a train.

Waiting time (m minutes)	Frequency
$0 < m \leqslant 5$	4
$5 < m \leqslant 10$	5
$10 < m \leqslant 15$	11
$15 < m \leqslant 20$	8
$20 < m \leqslant 25$	22

(a) Find the modal class.

(1)

(b) Find the class interval that contains the median waiting time.

(2)

(c) Calculate an estimate for the mean waiting time.

minutes

(3)

(Total for Question 26 is 6 marks)

27

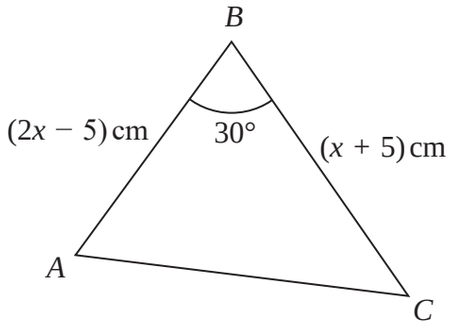


Diagram **NOT** accurately drawn

The diagram shows $\triangle ABC$ in which

$AB = (2x - 5)\,\text{cm}$ $BC = (x + 5)\,\text{cm}$ $\angle ABC = 30°$

The area of $\triangle ABC$ is $15.75\,\text{cm}^2$

Calculate the length, in cm to 3 significant figures, of AC.

cm

(Total for Question 27 is 6 marks)

28 (a) Factorise fully $15x^3y - 20x^2y^2$

(2)

(b) Simplify fully $\dfrac{(27x^6)^{\frac{2}{3}}}{18x^3}$

(3)

(c) Given that $(x - 2)$ is a factor of $2x^3 + 3x^2 + kx - 6$

find the value of k.

$k =$

(2)

(Total for Question 28 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS

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