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* ▶

P60794A



1/1/1/

P 6 0 7 9 4 A 0 1 2 4

Pearson

**Answer ALL TWENTY EIGHT questions.**

**Write your answers in the spaces provided.**

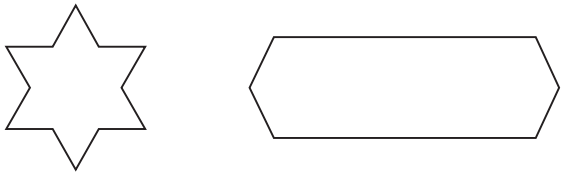
**You must write down all the stages in your working.**

**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 $\frac{dy}{dx}$

$\frac{dy}{dx} =$

**(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 $9.6 \times 10^{-7}$ 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)**

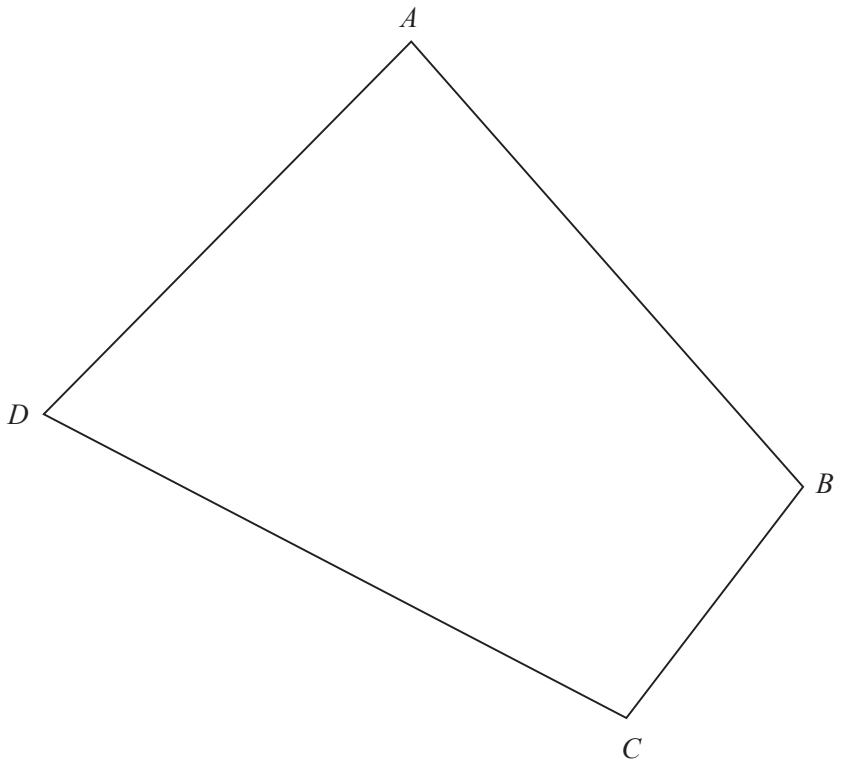
**14** Solve the equation

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

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)**

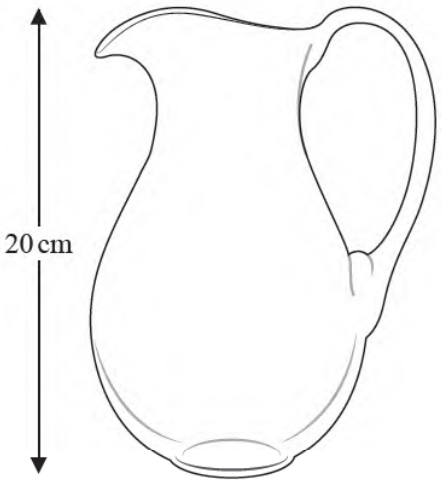
**16** $t$ varies inversely as the square of $a$ where $a > 0$
$t = 14$ when $a = 5$

Calculate the value of $a$ when $t = 224$

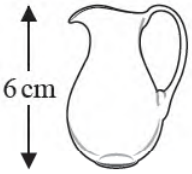
$a =$

**(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**

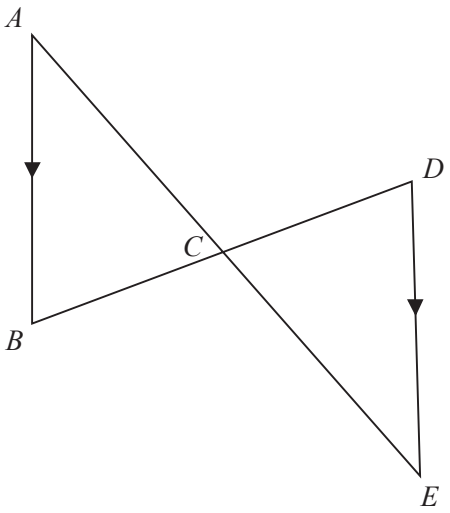



Diagram **NOT** accurately drawn

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**

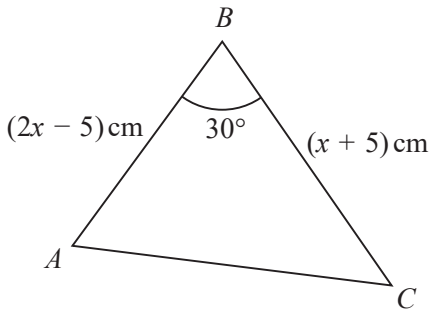



Diagram **NOT** accurately drawn

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**

**BLANK PAGE**

**BLANK PAGE**

**BLANK PAGE**