

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

**Pearson Edexcel  
Level 1/Level 2 GCSE (9–1)**

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# Tuesday 5 November 2019

Morning (Time: 1 hour 30 minutes)

Paper Reference **1MA1/1H**

## Mathematics

### Paper 1 (Non-Calculator) Higher Tier

**You must have:** Ruler graduated in centimetres and millimetres,  
protractor, pair of compasses, pen, HB pencil, eraser.  
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.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**



#### Information

- The total mark for this paper is 80
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

*Turn over ▶*

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P 5 8 8 6 6 A 0 1 2 4



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**Answer ALL questions.**

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

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

- 1 Find the Lowest Common Multiple (LCM) of 108 and 120

(Total for Question 1 is 3 marks)



- 2 There are 60 people in a choir.  
Half of the people in the choir are women.

The number of women in the choir is 3 times the number of men in the choir.  
The rest of the people in the choir are children.

the number of children in the choir : the number of men in the choir =  $n : 1$

Work out the value of  $n$ .  
You must show how you get your answer.

$n = \dots$

(Total for Question 2 is 4 marks)

- 3 Work out  $1\frac{3}{4} \times 1\frac{1}{3}$

Give your answer as a mixed number.

.....

(Total for Question 3 is 3 marks)



- 4 Use a ruler and compasses to construct the line from the point  $P$  perpendicular to the line  $CD$ . You must show **all** construction lines.

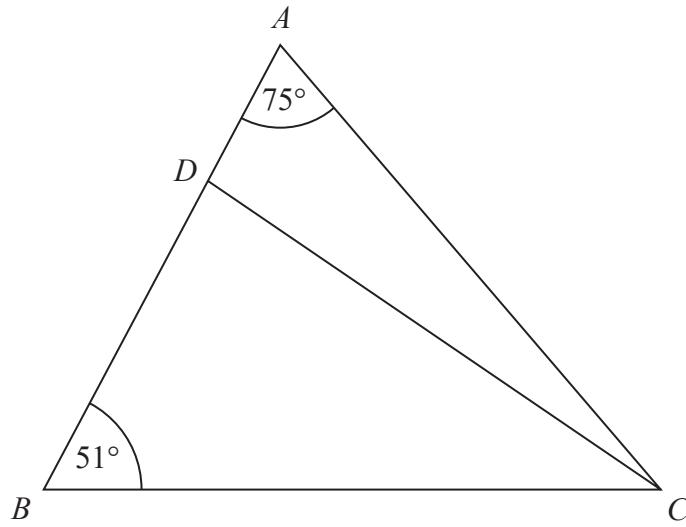
$\times P$

$C$  \_\_\_\_\_  $D$

(Total for Question 4 is 2 marks)



- 5 The diagram shows triangle  $ABC$ .



$ADB$  is a straight line.

the size of angle  $DCB$  : the size of angle  $ACD = 2 : 1$

Work out the size of angle  $BDC$ .

(Total for Question 5 is 4 marks)



P 5 8 8 6 6 A 0 5 2 4

- 6** 4 red bricks have a mean weight of 5 kg.  
5 blue bricks have a mean weight of 9 kg.  
1 green brick has a weight of 6 kg.

Donna says,

“The mean weight of the 10 bricks is less than 7 kg.”

Is Donna correct?

You must show how you get your answer.

(Total for Question 6 is 3 marks)



7 (a) Simplify  $(p^2)^5$

.....  
(1)

(b) Simplify  $12x^7y^3 \div 6x^3y$

.....  
(2)

**(Total for Question 7 is 3 marks)**



P 5 8 8 6 6 A 0 7 2 4

- 8 The accurate scale drawing shows the positions of port  $P$  and a lighthouse  $L$ .

N



P

N



L

Scale: 1 cm represents 4 km.

Aleena sails her boat from port  $P$  on a bearing of  $070^\circ$

She sails for  $1\frac{1}{2}$  hours at an average speed of 12 km/h to a port  $Q$ .

Find

- (i) the distance, in km, of port  $Q$  from lighthouse  $L$ ,
- (ii) the bearing of port  $Q$  from lighthouse  $L$ .

distance  $QL$  = ..... km

bearing of  $Q$  from  $L$  = .....  $^\circ$

**(Total for Question 8 is 5 marks)**



9 A car travels for 18 minutes at an average speed of 72 km/h.

- (a) How far will the car travel in these 18 minutes?

..... km

(2)

David says,

“72 kilometres per hour is faster than 20 metres per second.”

- (b) Is David correct?

You must show how you get your answer.

(2)

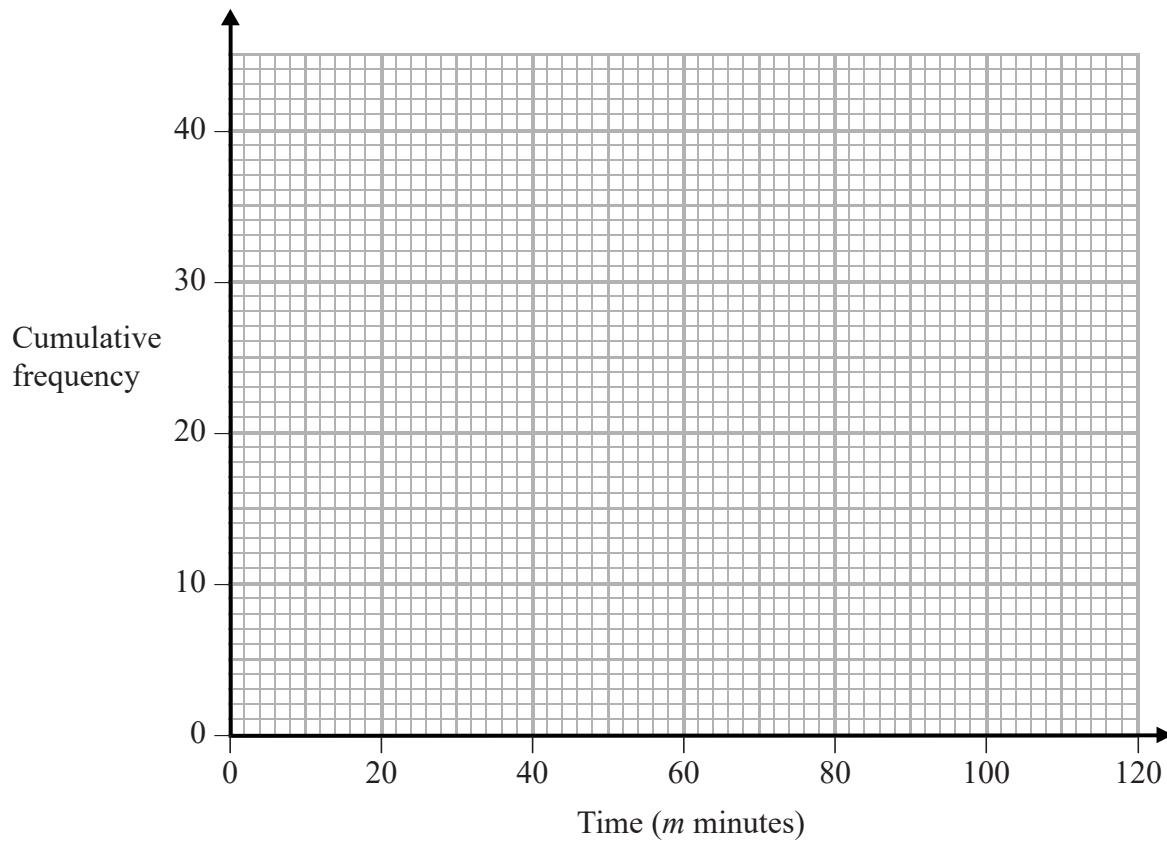
**(Total for Question 9 is 4 marks)**



- 10** The cumulative frequency table shows information about the times, in minutes, taken by 40 people to complete a puzzle.

Time ( $m$ minutes)	Cumulative frequency
$20 < m \leq 40$	5
$20 < m \leq 60$	25
$20 < m \leq 80$	35
$20 < m \leq 100$	38
$20 < m \leq 120$	40

- (a) On the grid below, draw a cumulative frequency graph for this information.



(2)



- (b) Use your graph to find an estimate for the interquartile range.

..... minutes  
(2)

One of the 40 people is chosen at random.

- (c) Use your graph to find an estimate for the probability that this person took between 50 minutes and 90 minutes to complete the puzzle.

.....  
(2)

**(Total for Question 10 is 6 marks)**



- 11 There are  $p$  counters in a bag.  
12 of the counters are yellow.

Shafiq takes at random 30 counters from the bag.  
5 of these 30 counters are yellow.

Work out an estimate for the value of  $p$ .

.....

(Total for Question 11 is 2 marks)

12  $T = \frac{q}{2} + 5$

Here is Spencer's method to make  $q$  the subject of the formula.

$$2 \times T = q + 5$$

$$q = 2T - 5$$

What mistake did Spencer make in the first line of his method?

.....

.....

(Total for Question 12 is 1 mark)



13 (a) Write  $\frac{5}{x+1} + \frac{2}{3x}$  as a single fraction in its simplest form.

.....

(2)

(b) Factorise  $(x+y)^2 + 3(x+y)$

.....

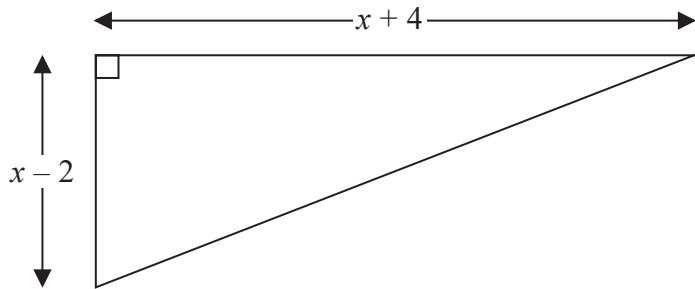
(1)

**(Total for Question 13 is 3 marks)**



P 5 8 8 6 6 A 0 1 3 2 4

**14** The diagram shows a right-angled triangle.



All the measurements are in centimetres.

The area of the triangle is  $27.5 \text{ cm}^2$

Work out the length of the shortest side of the triangle.

You must show all your working.

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..... cm

(Total for Question 14 is 4 marks)



- 15** Express  $0.\dot{4}\dot{1}\dot{8}$  as a fraction.  
You must show all your working.

.....  
**(Total for Question 15 is 3 marks)**

- 16** (a) Rationalise the denominator of  $\frac{22}{\sqrt{11}}$

Give your answer in its simplest form.

.....  
**(2)**

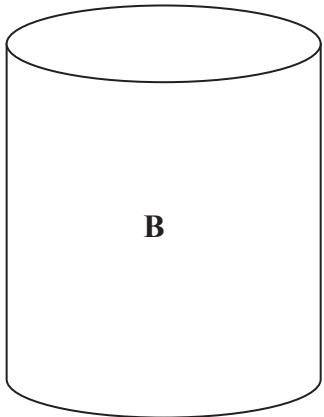
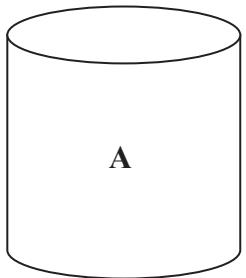
- (b) Show that  $\frac{\sqrt{3}}{2\sqrt{3}-1}$  can be written in the form  $\frac{a+\sqrt{3}}{b}$  where  $a$  and  $b$  are integers.

.....  
**(3)**

**(Total for Question 16 is 5 marks)**



**17** A and B are two similar cylindrical containers.



the surface area of container A : the surface area of container B = 4 : 9

Tyler fills container A with water.

She then pours all the water into container B.

Tyler repeats this and stops when container B is full of water.

Work out the number of times that Tyler fills container A with water.

You must show all your working.

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(Total for Question 17 is 4 marks)



**18** The function  $f$  is given by

$$f(x) = 2x^3 - 4$$

- (a) Show that  $f^{-1}(50) = 3$

(2)

The functions  $g$  and  $h$  are given by

$$g(x) = x + 2 \text{ and } h(x) = x^2$$

- (b) Find the values of  $x$  for which

$$hg(x) = 3x^2 + x - 1$$

.....  
(4)

**(Total for Question 18 is 6 marks)**



P 5 8 8 6 6 A 0 1 7 2 4

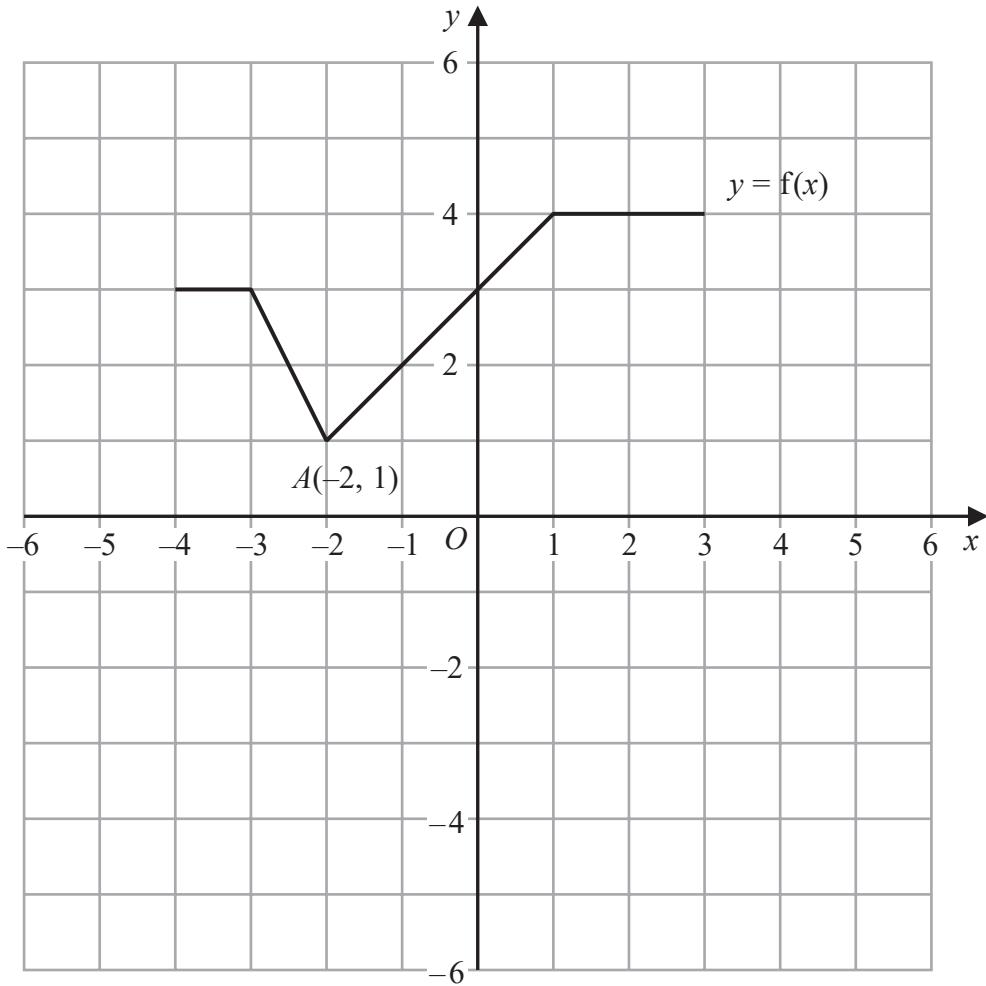
- 19** Given that  $9^{-\frac{1}{2}} = 27^{\frac{1}{4}} \div 3^{x+1}$   
find the exact value of  $x$ .

$x = \dots$

**(Total for Question 19 is 3 marks)**



- 20 The graph of  $y = f(x)$  is shown on the grid.



- (a) On the grid, draw the graph with equation  $y = f(x + 1) - 3$

(2)

Point  $A(-2, 1)$  lies on the graph of  $y = f(x)$ .

When the graph of  $y = f(x)$  is transformed to the graph with equation  $y = f(-x)$ , point  $A$  is mapped to point  $B$ .

- (b) Write down the coordinates of point  $B$ .

(....., .....)  
(1)

(Total for Question 20 is 3 marks)



P 5 8 8 6 6 A 0 1 9 2 4

**21** Sketch the graph of

$$y = 2x^2 - 8x - 5$$

showing the coordinates of the turning point and the exact coordinates of any intercepts with the coordinate axes.

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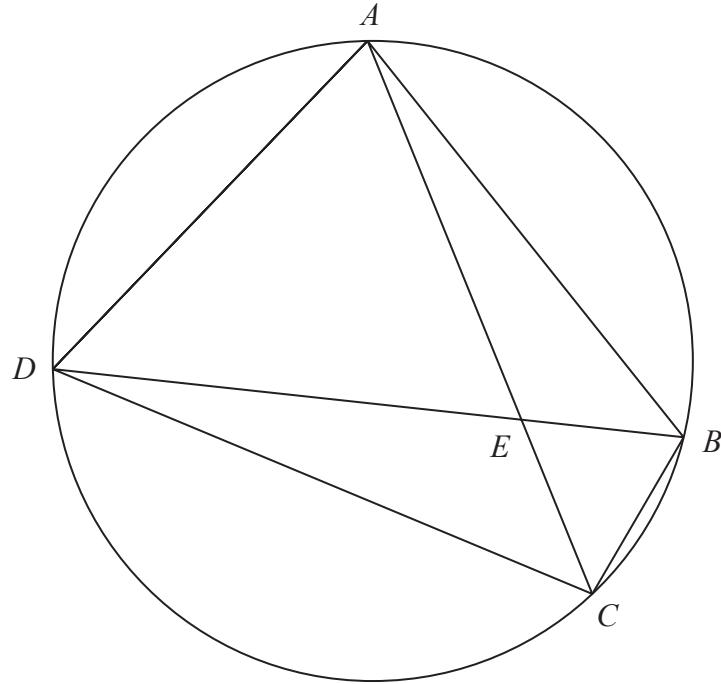
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(Total for Question 21 is 5 marks)



22  $A, B, C$  and  $D$  are four points on a circle.



$AEC$  and  $DEB$  are straight lines.

Triangle  $AED$  is an equilateral triangle.

Prove that triangle  $ABC$  is congruent to triangle  $DCB$ .

(Total for Question 22 is 4 marks)

**TOTAL FOR PAPER IS 80 MARKS**



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