

Write your name here

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

Centre Number

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Candidate Number

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# Mathematics

## Paper 1 (Non-Calculator)

**Higher Tier**

Thursday 25 May 2017 – Morning  
**Time: 1 hour 30 minutes**

Paper Reference

**1MA1/1H**

**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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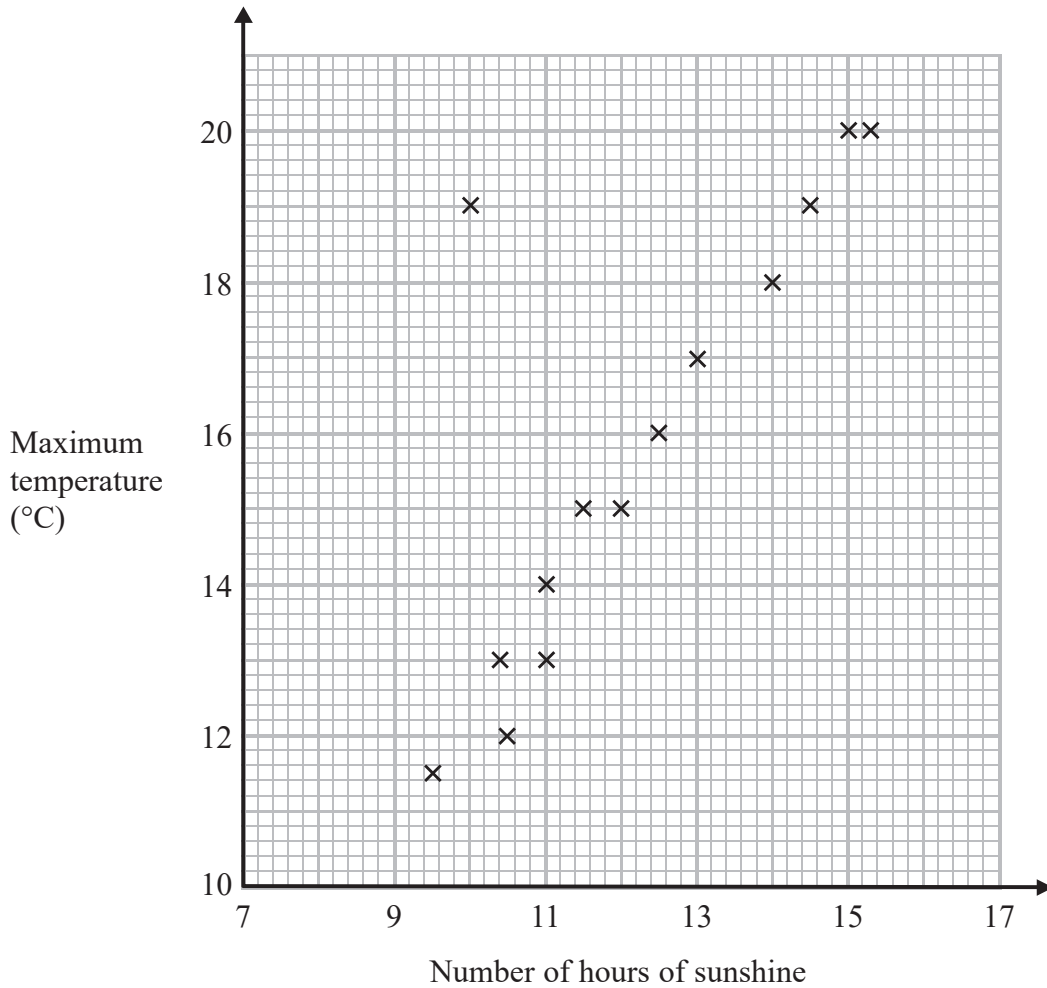
  
Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 The scatter graph shows the maximum temperature and the number of hours of sunshine in fourteen British towns on one day.



One of the points is an outlier.

- (a) Write down the coordinates of this point.

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

- (b) For all the other points write down the type of correlation.

.....  
(1)



On the same day, in another British town, the maximum temperature was  $16.4^{\circ}\text{C}$ .

(c) Estimate the number of hours of sunshine in this town on this day.

..... hours  
(2)

A weatherman says,

“Temperatures are higher on days when there is more sunshine.”

(d) Does the scatter graph support what the weatherman says?  
Give a reason for your answer.

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

**(Total for Question 1 is 5 marks)**

**2** Express 56 as the product of its prime factors.

.....  
(Total for Question 2 is 2 marks)

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3 Work out  $54.6 \times 4.3$

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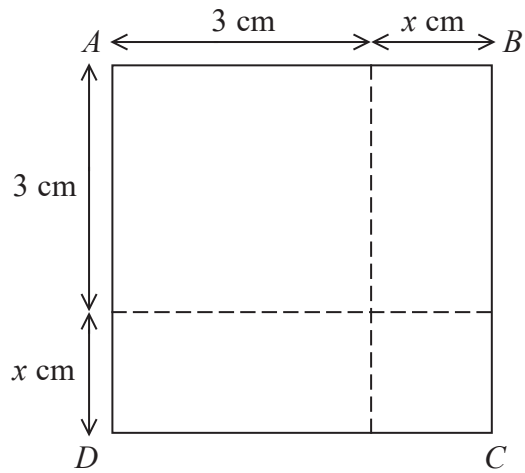
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.....  
(Total for Question 3 is 3 marks)



4



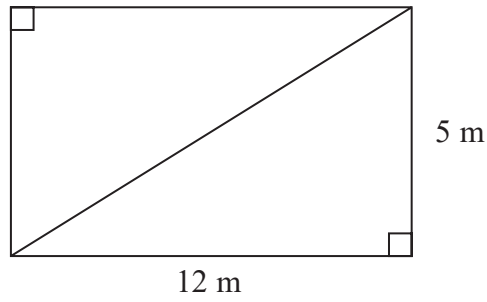
The area of square  $ABCD$  is  $10\text{ cm}^2$ .

Show that  $x^2 + 6x = 1$

(Total for Question 4 is 3 marks)



5 This rectangular frame is made from 5 straight pieces of metal.



The weight of the metal is 1.5 kg per metre.

Work out the total weight of the metal in the frame.

..... kg

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

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- 6 The equation of the line  $L_1$  is  $y = 3x - 2$   
The equation of the line  $L_2$  is  $3y - 9x + 5 = 0$

Show that these two lines are parallel.

(Total for Question 6 is 2 marks)

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- 7 There are 10 boys and 20 girls in a class.  
The class has a test.

The mean mark for all the class is 60

The mean mark for the girls is 54

Work out the mean mark for the boys.

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

- 8 (a) Write  $7.97 \times 10^{-6}$  as an ordinary number.

.....  
**(1)**

- (b) Work out the value of  $(2.52 \times 10^5) \div (4 \times 10^{-3})$   
Give your answer in standard form.

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

**(Total for Question 8 is 3 marks)**

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9 Jules buys a washing machine.

20% VAT is added to the price of the washing machine.  
Jules then has to pay a total of £600

What is the price of the washing machine with **no** VAT added?

£.....

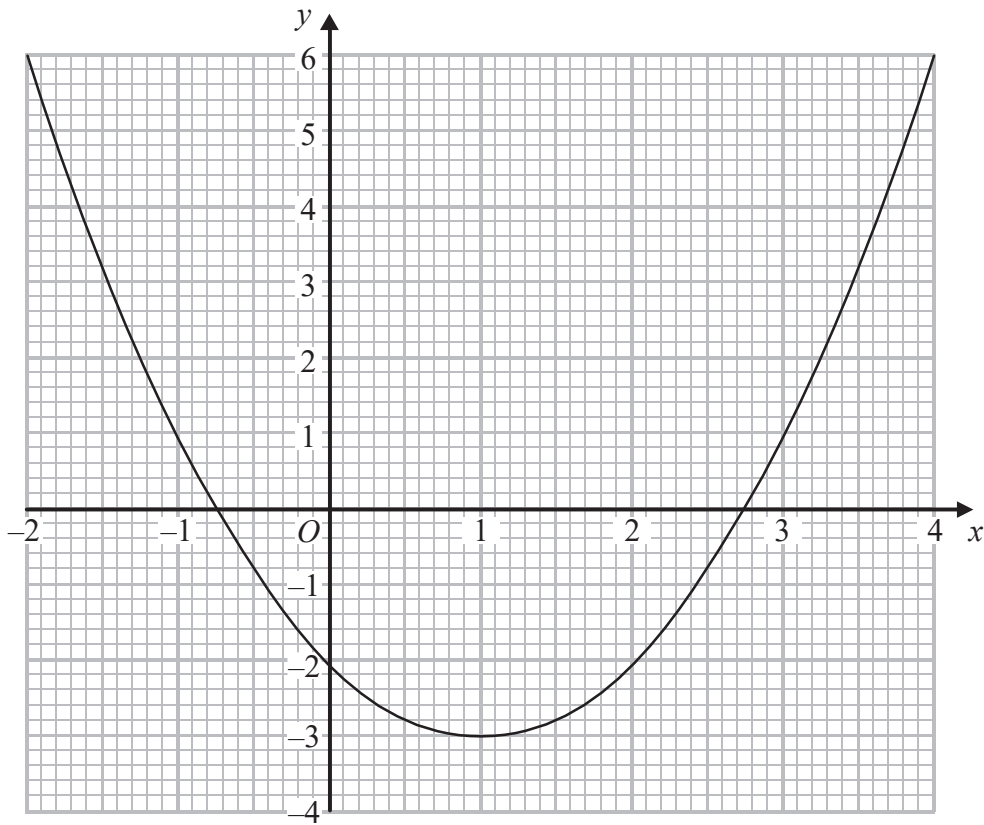
(Total for Question 9 is 2 marks)

10 Show that  $(x + 1)(x + 2)(x + 3)$  can be written in the form  $ax^3 + bx^2 + cx + d$   
where  $a$ ,  $b$ ,  $c$  and  $d$  are positive integers.

(Total for Question 10 is 3 marks)



11 The graph of  $y = f(x)$  is drawn on the grid.



(a) Write down the coordinates of the turning point of the graph.

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

(b) Write down estimates for the roots of  $f(x) = 0$

.....  
(1)

(c) Use the graph to find an estimate for  $f(1.5)$

.....  
(1)

**(Total for Question 11 is 3 marks)**

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12 (a) Find the value of  $81^{-\frac{1}{2}}$

.....  
(2)

(b) Find the value of  $\left(\frac{64}{125}\right)^{\frac{2}{3}}$

.....  
(2)

(Total for Question 12 is 4 marks)

13 The table shows a set of values for  $x$  and  $y$ .

$x$	1	2	3	4
$y$	9	$2\frac{1}{4}$	1	$\frac{9}{16}$

$y$  is inversely proportional to the square of  $x$ .

(a) Find an equation for  $y$  in terms of  $x$ .

.....  
(2)

(b) Find the positive value of  $x$  when  $y = 16$

.....  
(2)

(Total for Question 13 is 4 marks)



- 14 White shapes and black shapes are used in a game.  
Some of the shapes are circles.  
All the other shapes are squares.

The ratio of the number of white shapes to the number of black shapes is 3:7

The ratio of the number of white circles to the number of white squares is 4:5

The ratio of the number of black circles to the number of black squares is 2:5

Work out what fraction of all the shapes are circles.

.....  
(Total for Question 14 is 4 marks)

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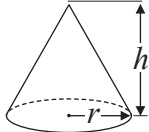
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15 A cone has a volume of  $98 \text{ cm}^3$ .  
The radius of the cone is  $5.13 \text{ cm}$ .

Volume of cone =  $\frac{1}{3} \pi r^2 h$



(a) Work out an estimate for the height of the cone.

.....cm  
(3)

John uses a calculator to work out the height of the cone to 2 decimal places.

(b) Will your estimate be more than John's answer or less than John's answer?  
Give reasons for your answer.

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

**(Total for Question 15 is 4 marks)**

16  $n$  is an integer greater than 1

Prove algebraically that  $n^2 - 2 - (n - 2)^2$  is always an even number.

**(Total for Question 16 is 4 marks)**

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17 There are 9 counters in a bag.

7 of the counters are green.

2 of the counters are blue.

Ria takes at random two counters from the bag.

Work out the probability that Ria takes one counter of each colour.

You must show your working.

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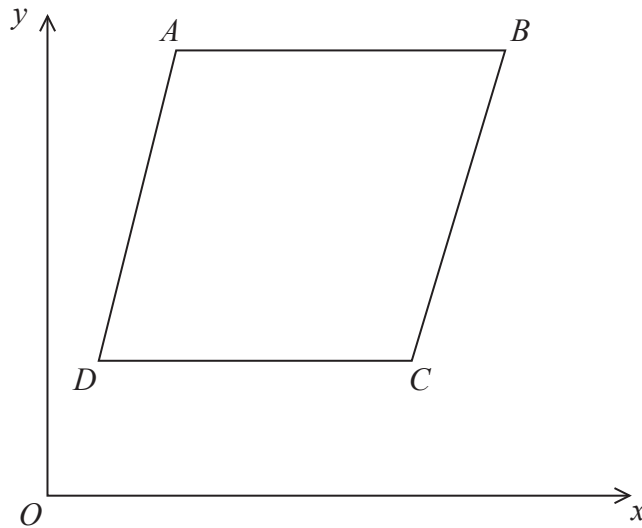
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.....  
(Total for Question 17 is 4 marks)



18



$ABCD$  is a rhombus.

The coordinates of  $A$  are  $(5, 11)$

The equation of the diagonal  $DB$  is  $y = \frac{1}{2}x + 6$

Find an equation of the diagonal  $AC$ .

(Total for Question 18 is 4 marks)

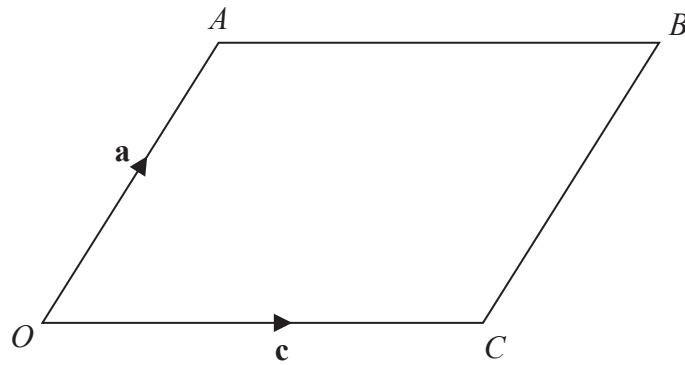
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19



$OABC$  is a parallelogram.

$$\vec{OA} = \mathbf{a} \text{ and } \vec{OC} = \mathbf{c}$$

$X$  is the midpoint of the line  $AC$ .

$OCD$  is a straight line so that  $OC : CD = k : 1$

$$\text{Given that } \vec{XD} = 3\mathbf{c} - \frac{1}{2}\mathbf{a}$$

find the value of  $k$ .

$$k = \dots\dots\dots$$

(Total for Question 19 is 4 marks)

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20 Solve algebraically the simultaneous equations

$$\begin{aligned}x^2 + y^2 &= 25 \\ y - 3x &= 13\end{aligned}$$

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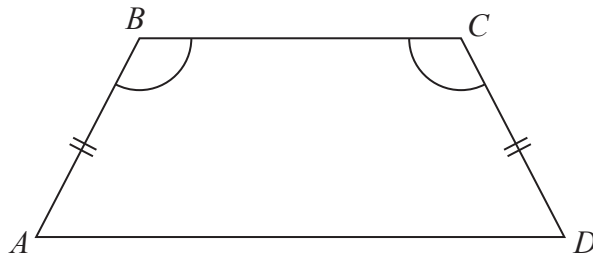
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.....  
(Total for Question 20 is 5 marks)



21  $ABCD$  is a quadrilateral.



$$AB = CD.$$

$$\text{Angle } ABC = \text{angle } BCD.$$

Prove that  $AC = BD$ .

(Total for Question 21 is 4 marks)

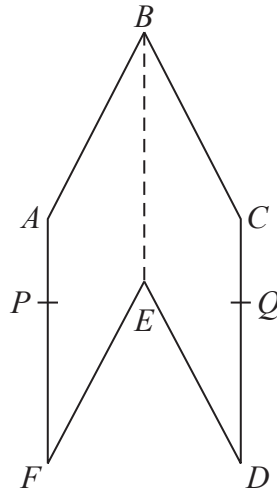
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22 The diagram shows a hexagon  $ABCDEF$ .



$ABEF$  and  $CBED$  are congruent parallelograms where  $AB = BC = x$  cm.  
 $P$  is the point on  $AF$  and  $Q$  is the point on  $CD$  such that  $BP = BQ = 10$  cm.

Given that angle  $ABC = 30^\circ$ ,

prove that  $\cos PBQ = 1 - \frac{(2 - \sqrt{3})x^2}{200}$

(Total for Question 22 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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