Write your name here

Surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 3 (Calculator)

Higher Tier

Specimen Papers Set 1	Paper Reference
Time: 1 hour 30 minutes	**1MA1/3H**

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator.

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.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.



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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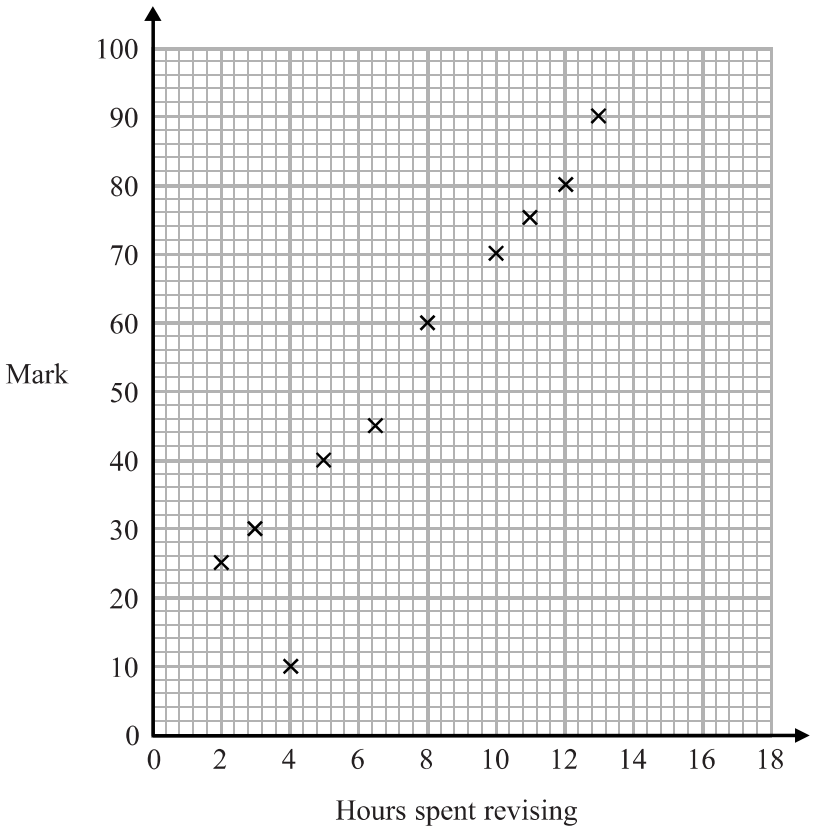
Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The scatter diagram shows information about 10 students.

For each student, it shows the number of hours spent revising and the mark the student achieved in the Spanish test.



One of the points is an outlier.

(a) Write down the coordinates of the outlier.

.....

(1)

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For all the **other** points

(b) (i) draw the line of best fit,

(ii) describe the correlation.

.....

.....

(2)

A different student studies for 9 hours.

(c) Estimate the mark gained by this student.

.....

(1)

The Spanish test was marked out of 100

Lucia says,

"I can see from the graph that had I revised for 18 hours I would have got full marks."

(d) Comment on what Lucia says.

.....

.....

(1)

(Total for Question 1 is 5 marks)

2 The length, L cm, of a line is measured as 13 cm correct to the nearest centimetre.

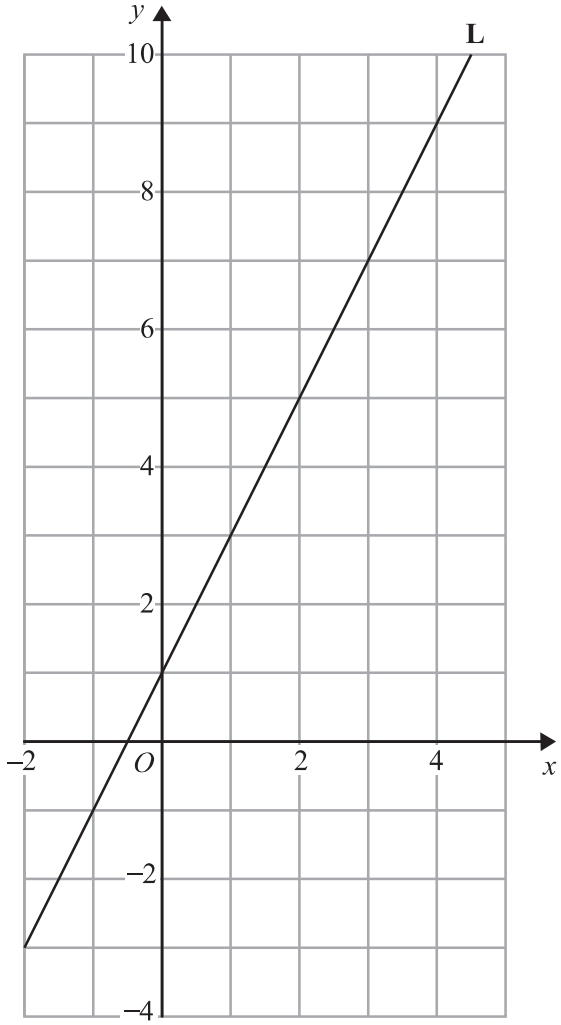
Complete the following statement to show the range of possible values of L

..... $\leqslant L <$ .....

(Total for Question 2 is 2 marks)

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3 Line **L** is drawn on the grid below.



Find the equation for the straight line **L**.
Give your answer in the form $y = mx + c$

.....

(Total for Question 3 is 3 marks)

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4 Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist (w inches)	Frequency
Small	$28 < w \leqslant 32$	24
Medium	$32 < w \leqslant 36$	12
Large	$36 < w \leqslant 40$	8
Extra Large	$40 < w \leqslant 44$	6

(a) Calculate an estimate for the mean waist size.

.....inches

(3)

Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.
The modal size of belts sold is Small.

Jenny is going to order $\frac{3}{4}$ of the belts in size Small.

The manager of the shop tells Jenny she should **not** order so many Small belts.

(b) Who is correct, Jenny or the manager?
You must give a reason for your answer.

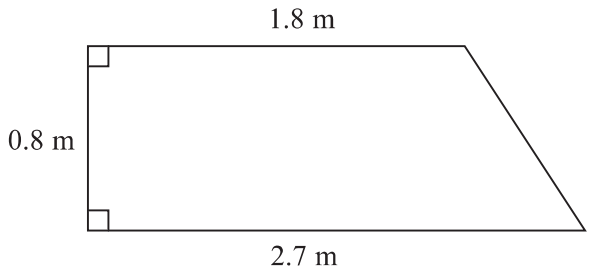
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(2)

(Total for Question 4 is 5 marks)

5 The diagram shows a wall in the shape of a trapezium.



Karen is going to cover this part of the wall with tiles.
Each tile is rectangular, 15 cm by 7.5 cm

Tiles are sold in packs.
There are 9 tiles in each pack.

Karen divides the area of this wall by the area of a tile to work out an estimate for the number of tiles she needs to buy.

(a) Use Karen's method to work out the estimate for the number of packs of tiles she needs to buy.

.....

(5)

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Karen is advised to buy 10% more tiles than she estimated.
Buying 10% more tiles will affect the number of the tiles Karen needs to buy.

She assumes she will need to buy 10% more packs of tiles.

(b) Is Karen's assumption correct?
You must show your working.

(2)

(Total for Question 5 is 7 marks)

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6 Factorise $x^2 + 3x - 4$

.....

(Total for Question 6 is 2 marks)

7 Here are the equations of four straight lines.

Line A $y = 2x + 4$
Line B $2y = x + 4$
Line C $2x + 2y = 4$
Line D $2x - y = 4$

Two of these lines are parallel.

Write down the two parallel lines?

Line ..... and line.....

(Total for Question 7 is 1 mark)

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8 Ian invested an amount of money at 3% per annum compound interest.
At the end of 2 years the value of the investment was £2652.25

(a) Work out the amount of money Ian invested.

£.....

(3)

Noah has an amount of money to invest for five years.

Saver Account	Investment Account
4% per annum compound interest.	21% interest paid at the end of 5 years.

Noah wants to get the most interest possible.

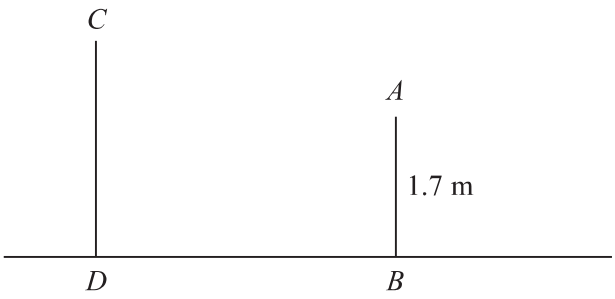
(b) Which account is best?
You must show how you got your answer.

(2)

(Total for Question 8 is 5 marks)

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9 The diagram shows two vertical posts, AB and CD, on horizontal ground.



$AB = 1.7$ m
$CD : AB = 1.5 : 1$

The angle of elevation of C from A is 52°

Calculate the length of BD.
Give your answer correct to 3 significant figures.

.....m

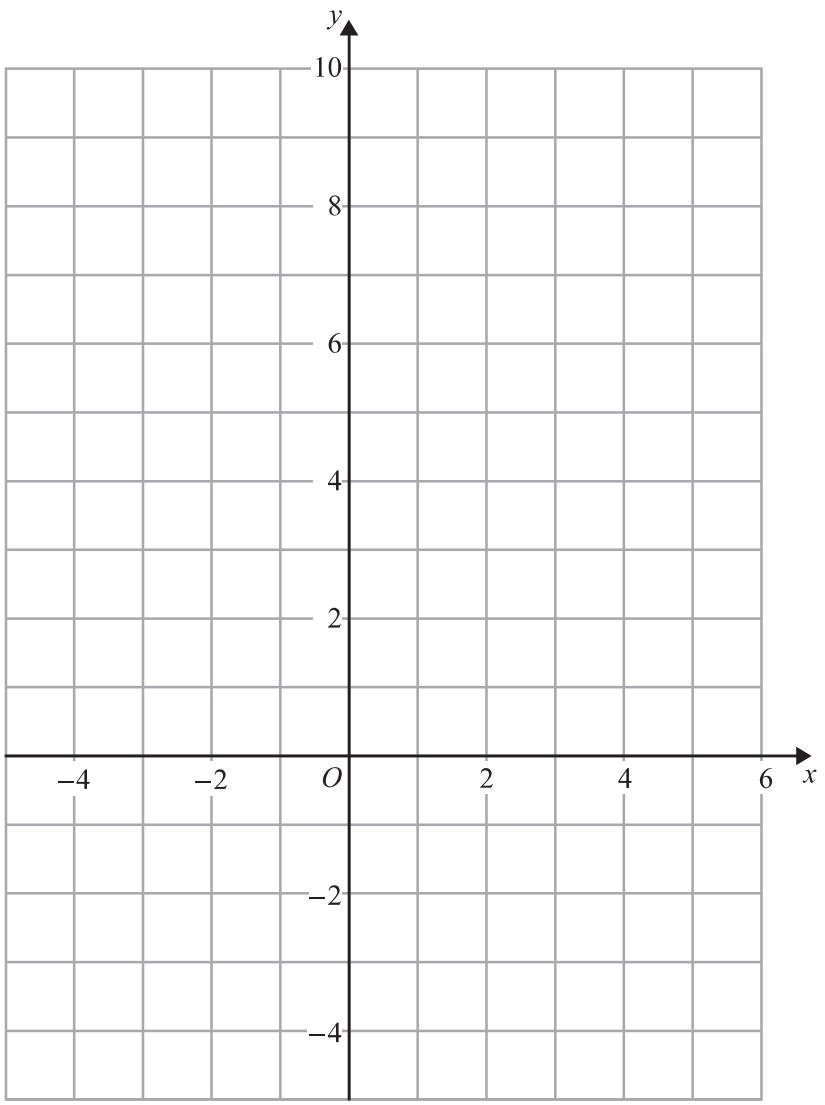
(Total of Question 9 is 4 marks)

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10 On the grid, shade the region that satisfies all these inequalities.

$$x + y < 4 \qquad y > x - 1 \qquad y < 3x$$

Label the region **R**.



(Total for Question 10 is 4 marks)

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11 Write $x^2 + 2x - 8$ in the form $(x + m)^2 + n$
where m and n are integers.

.....

(Total for Question 11 is 2 marks)

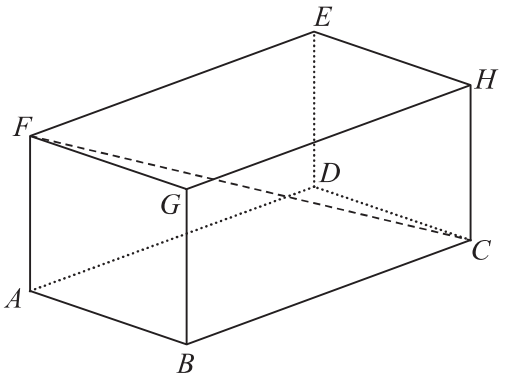
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12 The diagram shows a cuboid *ABCDEFGH*.



AB = 7 cm, *AF* = 5 cm and *FC* = 15 cm.

Calculate the volume of the cuboid.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 12 is 4 marks)

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13 There are 14 boys and 12 girls in a class.

Work out the total number of ways that 1 boy and 1 girl can be chosen from the class.

.....

(Total for Question 13 is 2 marks)

14 Write

$$4 - \left[(x + 3) \div \frac{x^2 + 5x + 6}{x - 2} \right]$$

as a single fraction in its simplest form.
You must show your working.

.....

(Total for Question 14 is 4 marks)

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15 A virus on a computer is causing errors.
An antivirus program is run to remove these errors.

An estimate for the number of errors at the end of t hours is $10^6 \times 2^{-t}$

(a) Work out an estimate for the number of errors on the computer at the end of 8 hours.

.....

(2)

(b) Explain whether the number of errors on this computer ever reaches zero.

.....

.....

.....

(1)

(Total for Question 15 is 3 marks)

16 The graph of $y = f(x)$ is transformed to give the graph of $y = -f(x + 3)$
The point A on the graph of $y = f(x)$ is mapped to the point P on the graph of $y = -f(x + 3)$

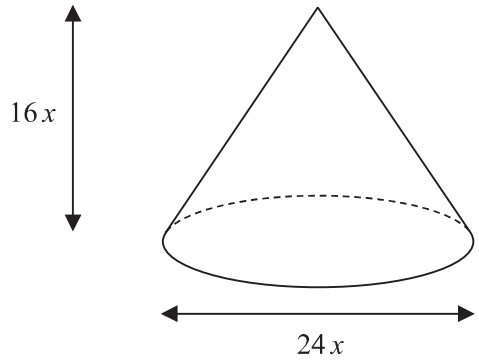
The coordinates of point A are (9, 1)
Find the coordinates of point P.

(..... , ...)

(Total for Question 16 is 2 marks)

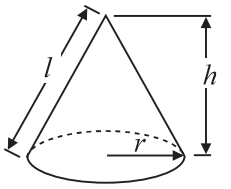
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17 The diagram shows a solid cone.



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

Curved surface area of cone $= \pi r l$



The diameter of the base of the cone is $24x$ cm.
The height of the cone is $16x$ cm.

The curved surface area of the cone is 2160π cm^2.
The volume of the cone is $V\pi$ cm^3, where V is an integer.

Find the value of V.

.....

(Total for Question 17 is 5 marks)

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18 Thelma spins a biased coin twice.
The probability that it will come down heads both times is 0.09

Calculate the probability that it will come down tails both times.

.....

(Total for Question 18 is 3 marks)

19 (a) Write 0.000 423 in standard form.

.....

(1)

(b) Write 4.5×10^4 as an ordinary number.

.....

(1)

(Total for Question 19 is 2 marks)

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20 Mark has made a clay model.
He will now make a clay statue that is mathematically similar to the clay model.

The model has a base area of $6\,cm^2$
The statue will have a base area of $253.5\,cm^2$

Mark used 2 kg of clay to make the model.

Clay is sold in 10 kg bags.
Mark has to buy all the clay he needs to make the statue.

How many bags of clay will Mark need to buy?

.....

(Total for Question 20 is 3 marks)

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21 (a) Show that the equation $3x^2 - x^3 + 3 = 0$ can be rearranged to give

$$x = 3 + \frac{3}{x^2}$$

(2)

(b) Using

$$x_{n+1} = 3 + \frac{3}{x_n^2} \quad \text{with } x_0 = 3.2,$$

find the values of x_1, x_2 and x_3

(3)

(c) Explain what the values of x_1, x_2 and x_3 represent.

.....

.....

(1)

(Total for Question 21 is 6 marks)

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22 Here are the first five terms of an arithmetic sequence.

7 13 19 25 31

Prove that the difference between the squares of any two terms of the sequence is always a multiple of 24

(Total for Question 22 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

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