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)

Time 1 hour 30 minutes

Paper reference **1MA1/3H**

Mathematics

PAPER 3 (Calculator)
Higher Tier
Mock set 7

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of 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.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **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.

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.
- 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 (a) Use your calculator to work out $\dfrac{\sqrt{8.7^2 + 12.4}}{9.5 - 1.2^3}$

Write down all the figures on your calculator display.

.....

(2)

(b) Write your answer to part (a) correct to 3 significant figures.

.....

(1)

(Total for Question 1 is 3 marks)

2 The area of a rectangle is $12\,m^2$

Work out the area of the rectangle in cm^2

..... cm^2

(Total for Question 2 is 2 marks)

3 Lethna buys some boxes of pens and some packets of pencils.

There are 40 pens in each box.
There are 12 pencils in each packet.

Lethna gives one pen and one pencil to each student in Year 7 of her school.
When she has done this she has no pens left and no pencils left.

Work out how many boxes of pens and how many packets of pencils Lethna could have bought.

..... boxes of pens

..... packets of pencils

(Total for Question 3 is 3 marks)

4 A shipping container is placed on horizontal ground.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

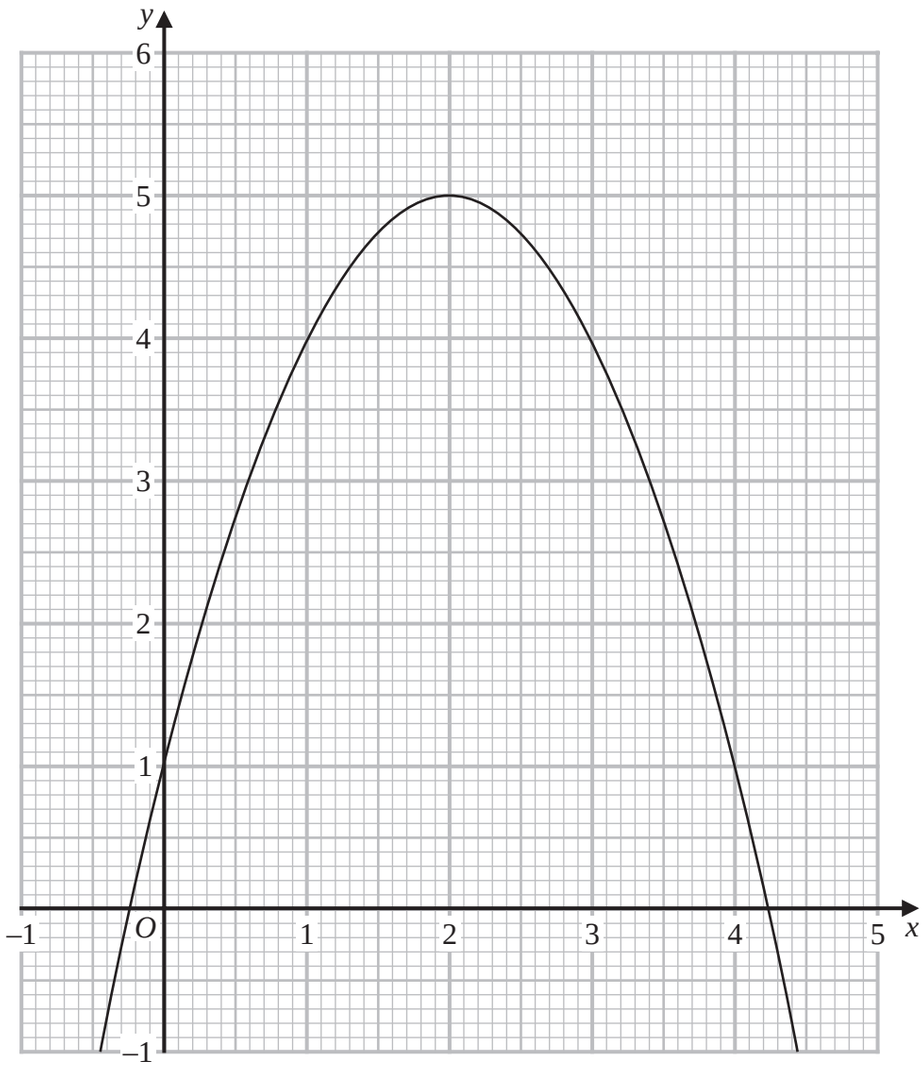
The container exerts a force of 29 400 newtons on the ground.
The pressure on the ground due to the container is 2000 newtons / m^2

Calculate the area of the container that is in contact with the ground.

.....

(Total for Question 4 is 3 marks)

5 Here is the graph of $y = 1 + 4x - x^2$



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

(..... , ...)

(1)

(b) Using the graph, find estimates for the solutions of the equation $1 + 4x - x^2 = 2.5$

.....

(2)

(Total for Question 5 is 3 marks)

6 Here is information about two savings accounts.

Savemore	**Highbrook**
Compound interest	Compound interest
1.25% each year	2.1% for the first year 0.95% for each extra year

Abi is going to invest £5000 in one of these savings accounts for 3 years.

She wants to have as much money as possible in the account at the end of 3 years.

(a) Which savings account should Abi choose?
You must show all your working.

(4)

Before Abi decides which savings account to choose, the rate of interest for the Savemore account is changed to 1.15% each year.

(b) Does this affect which savings account Abi should choose?
You must give a reason for your answer.

.....

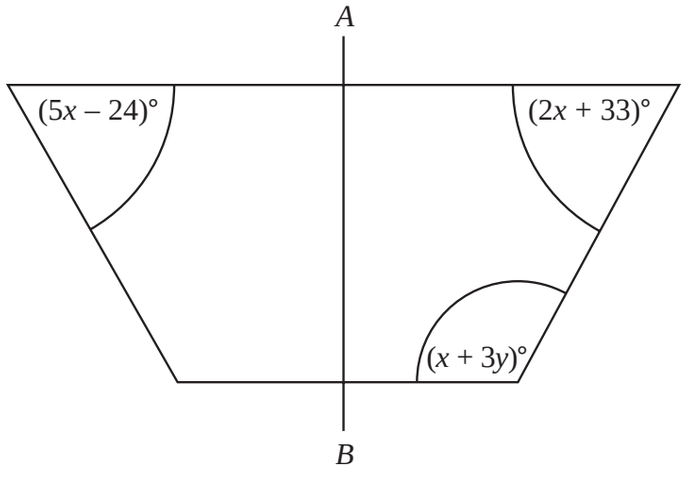
.....

.....

(1)

(Total for Question 6 is 5 marks)

7 The diagram shows a trapezium.
AB is the line of symmetry of the trapezium.



Work out the value of x and the value of y.

$x =$ .....

$y =$ .....

(Total for Question 7 is 5 marks)

8 The table gives information about the amounts of money that 40 shoppers spent in a shop.

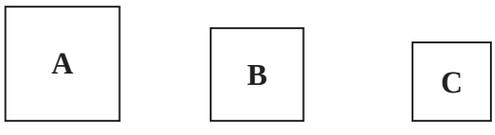
Amount (£a)	Frequency
$0 < a \leqslant 10$	8
$10 < a \leqslant 20$	14
$20 < a \leqslant 30$	8
$30 < a \leqslant 40$	6
$40 < a \leqslant 50$	4

Calculate an estimate for the mean amount of money spent by the 40 shoppers.

£.....

(Total for Question 8 is 3 marks)

9 Here are three squares.



The area of square **B** is 25% less than the area of square **A**.
The area of square **C** is 25% less than the area of square **B**.

Find the fraction $\frac{\text{area of square } \mathbf{C}}{\text{area of square } \mathbf{A}}$

.....

(Total for Question 9 is 3 marks)

10 The table shows information about the times taken by 100 people in a race.

Time (t minutes)	Frequency
$30 < t \leqslant 40$	10
$40 < t \leqslant 50$	22
$50 < t \leqslant 60$	28
$60 < t \leqslant 70$	20
$70 < t \leqslant 80$	15
$80 < t \leqslant 90$	5

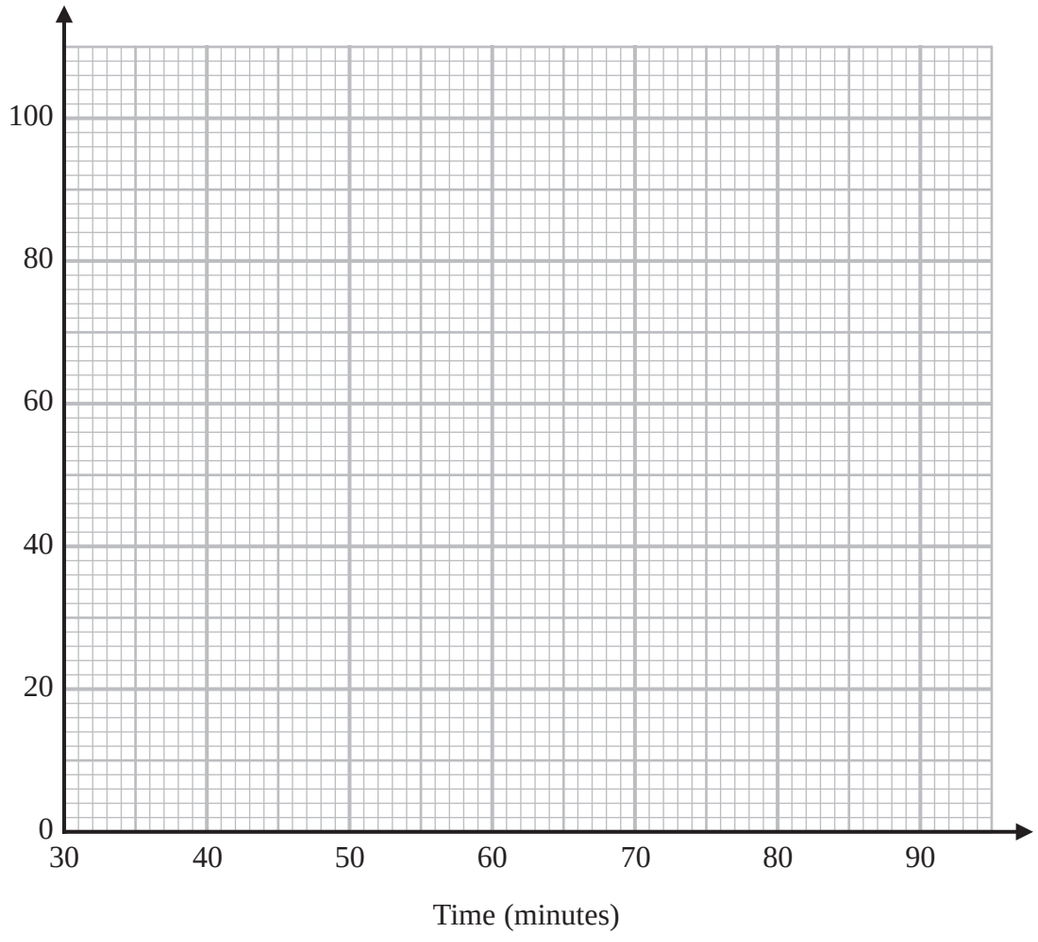
(a) Complete the cumulative frequency table for this information.

Time (t minutes)	Cumulative frequency
$30 < t \leqslant 40$	
$30 < t \leqslant 50$	
$30 < t \leqslant 60$	
$30 < t \leqslant 70$	
$30 < t \leqslant 80$	
$30 < t \leqslant 90$	

(1)

(b) On the grid opposite, draw a cumulative frequency graph for your table.

(2)



(c) Use your graph to find an estimate for the median time.

..... minutes

(1)

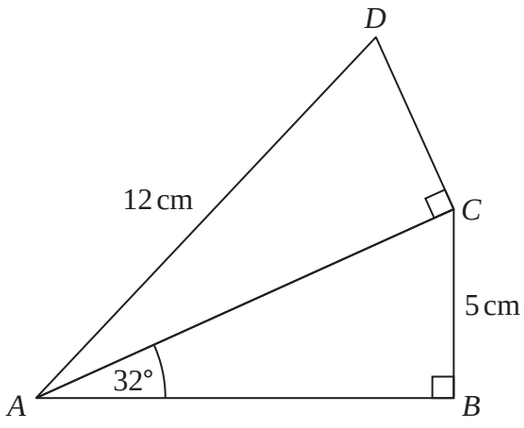
(d) Use your graph to find an estimate for the number of people in the race who took longer than 67 minutes.

.....

(2)

(Total for Question 10 is 6 marks)

11 *ABC* and *ACD* are right-angled triangles.



Work out the size of angle *DAC*.
Give your answer correct to 1 decimal place.

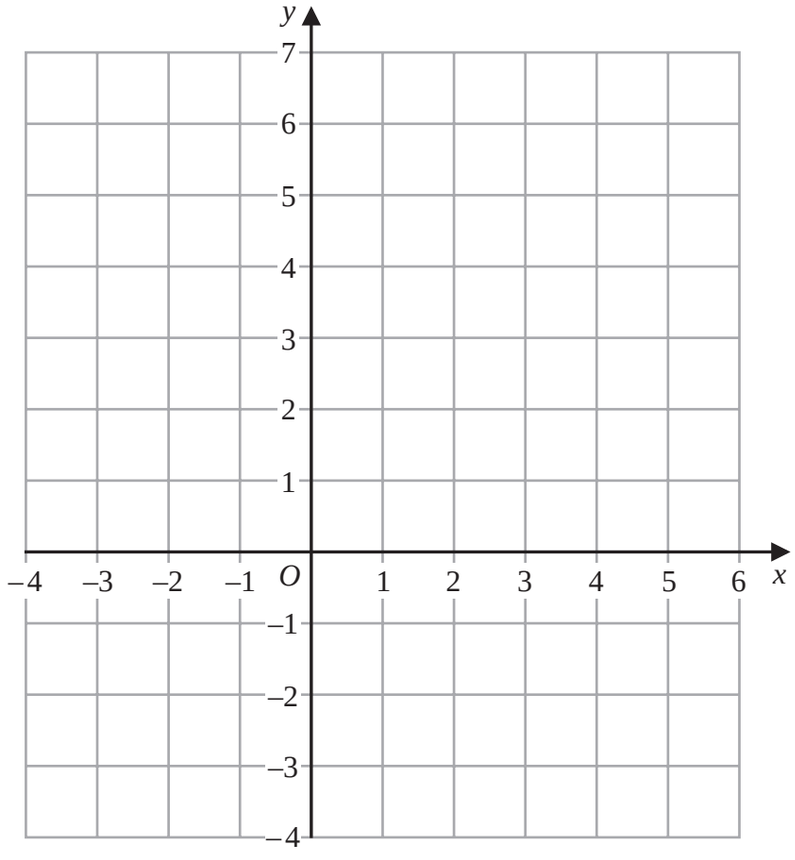
.....°

(Total for Question 11 is 4 marks)

12 On the grid show, by shading, the region that satisfies all these inequalities

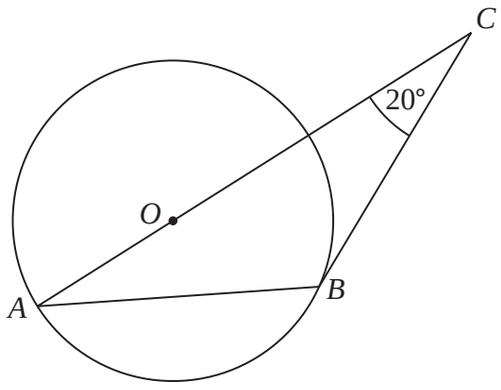
$$x + y < 5 \qquad y < 2x - 3 \qquad x - 2y < 4$$

Label the region **R**.



(Total for Question 12 is 4 marks)

13



A and *B* are points on the circumference of a circle, centre *O*.
BC is the tangent to the circle at *B*.
AOC is a straight line.

Angle *ACB* = 20°

Find the size of angle *CBA*.
You must show all your working.

.....°

(Total for Question 13 is 3 marks)

14 Simplify fully $\dfrac{x^2 + 3x + xy + 3y}{x^2 - y^2}$

.....

(Total for Question 14 is 3 marks)

15 Amir has x nuts and y bolts in a box.

Amir takes 6 nuts and 6 bolts from the box.
The ratio of the number of nuts to the number of bolts now in the box is 1 : 2

Amir then takes 8 more nuts and 8 more bolts from the box.
The ratio of the number of nuts to the number of bolts now in the box is 2 : 5

Find, in its simplest form, the ratio $x : y$

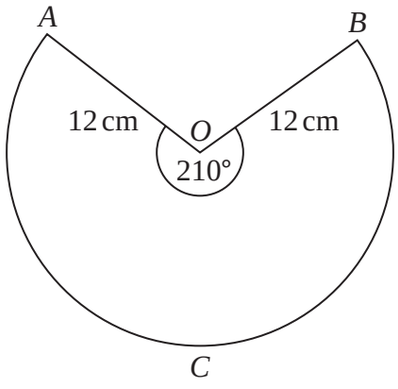
.....

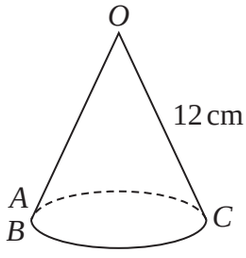
(Total for Question 15 is 5 marks)

16 The diagram shows sector $OACB$ of a circle with centre O and radius 12 cm.

Reflex angle $AOB = 210°$

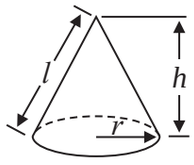
The diagram also shows a hollow cone with vertex O.
The curved surface of the cone is formed by joining OA to OB.
Arc ACB forms the circumference of the base of the cone.





Curved surface area of cone = πrl

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



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

..... cm^3

(Total for Question 16 is 4 marks)

17 There are only 3 red sweets, 2 yellow sweets and 4 green sweets in a bag.

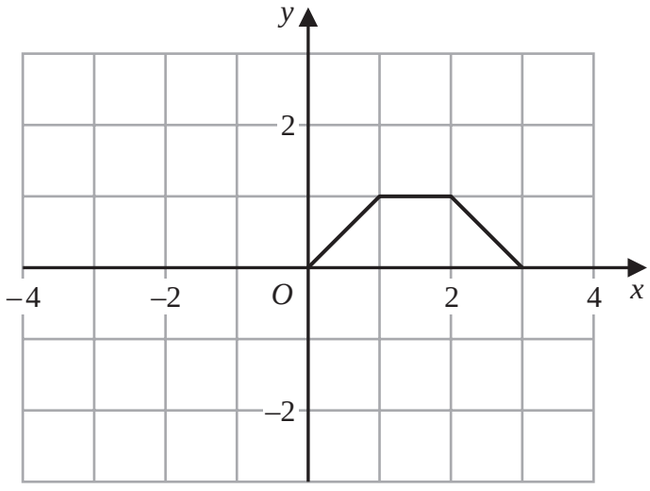
Nicola takes at random two sweets from the bag.

Work out the probability that the two sweets are **not** the same colour.

.....

(Total for Question 17 is 4 marks)

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



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

(1)

The curve with equation $y = 2x^2 + 5x - 3$ is transformed to the curve **T** by a translation with vector $\begin{pmatrix} 4 \\ 0 \end{pmatrix}$

(b) Find an equation of the curve **T**.
Give your answer in the form $y = ax^2 + bx + c$ where a, b and c are integers.

.....

(2)

(Total for Question 18 is 3 marks)

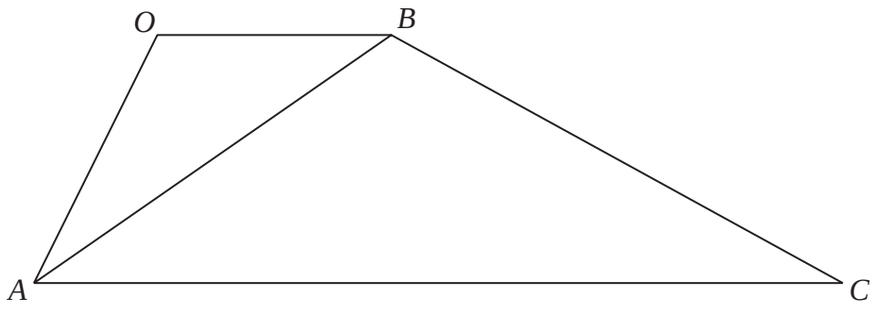
19 $y = \dfrac{d^2}{m}$

d = 11.3 correct to 3 significant figures.
m = 8.4 correct to 2 significant figures.

By considering bounds, calculate the value of y to a suitable degree of accuracy.
You must show all your working and give a reason for your final answer.

(Total for Question 19 is 4 marks)

20



The diagram shows a trapezium $AOBC$.
AC is parallel to OB.
$AC = 4OB$.

$\overrightarrow{OA} = \mathbf{a}$ $\overrightarrow{OB} = \mathbf{b}$

The point P lies on the line AB such that $AP : PB = 4 : 1$

Using a vector method, prove that OPC is a straight line.

(Total for Question 20 is 5 marks)

21 **C** is the circle with equation $x^2 + y^2 = 80$

P is a point on **C**.
The coordinates of P are $(-4, k)$ where $k < 0$

Find an equation of the tangent to **C** at the point P.

.....

(Total for Question 21 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS