Please check the examination details below before entering your candidate information

Candidate surname	Other names

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

Centre Number | | | | | |

Candidate Number | | | | |

Mock Set 6 – Spring 2021

Time: 1 hour 30 minutes

Paper Reference **1MA1/3H**

Mathematics

Paper 3 (Calculator)
Higher Tier

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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S 6 8 5 9 3 A 0 1 2 4

Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Find the highest common factor (HCF) of 78 and 130

.....

(2)

(b) Find the lowest common multiple (LCM) of 60 and 96

.....

(2)

(Total for Question 1 is 4 marks)

2 Nik owns a stationery shop.
She bought 72 pencils for a total cost of £4.68

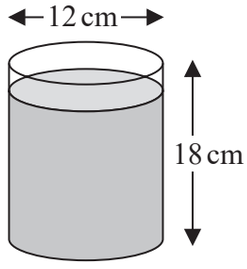
Nik sells all 72 pencils for 15p each.

Work out Nik's percentage profit.
Give your answer correct to 1 decimal place.

.....%

(Total for Question 2 is 4 marks)

3 Joel is going to make candles.
He will pour melted wax into moulds.



Each mould is in the shape of a cylinder with diameter 12 cm and height 18 cm.

Joel has 15 kg of solid wax.
He knows that 1 kg of solid wax makes 1170 cm^3 of melted wax.

To make each candle, Joel will pour melted wax into a mould to $\frac{7}{8}$ of the height of the mould.

He wants to make as many candles as he can.

How many candles can Joel make when using 15 kg of solid wax?
You must show your working.

.....

(Total for Question 3 is 5 marks)

4 In January, Lamai worked 45 hours per week and got paid £12.50 per hour.

In February, the number of hours Lamai worked per week was 20% less than the number of hours she worked per week in January.

She was paid 32% more per hour in February than in January.

Work out how much more Lamai was paid per week in February than in January.

£.....

(Total for Question 4 is 4 marks)

5 Jess rounds a number, n, to one decimal place.
The result is 15.6

Complete the error interval for n.

..... $\leqslant n <$ .....

(Total for Question 5 is 2 marks)

6 The table gives information about the weights, in kg, of 25 babies.

Weight (w kg)	Frequency
$2.5 < w \leqslant 3.0$	4
$3.0 < w \leqslant 3.5$	8
$3.5 < w \leqslant 4.0$	11
$4.0 < w \leqslant 4.5$	2

Work out an estimate for the mean weight.

..... kg

(Total for Question 6 is 3 marks)

7 Point A has coordinates $(-4, 2)$

Point A is translated to the point with coordinates $(-1, -3)$

Find, as a column vector, the vector that describes this translation.

$\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

(Total for Question 7 is 2 marks)

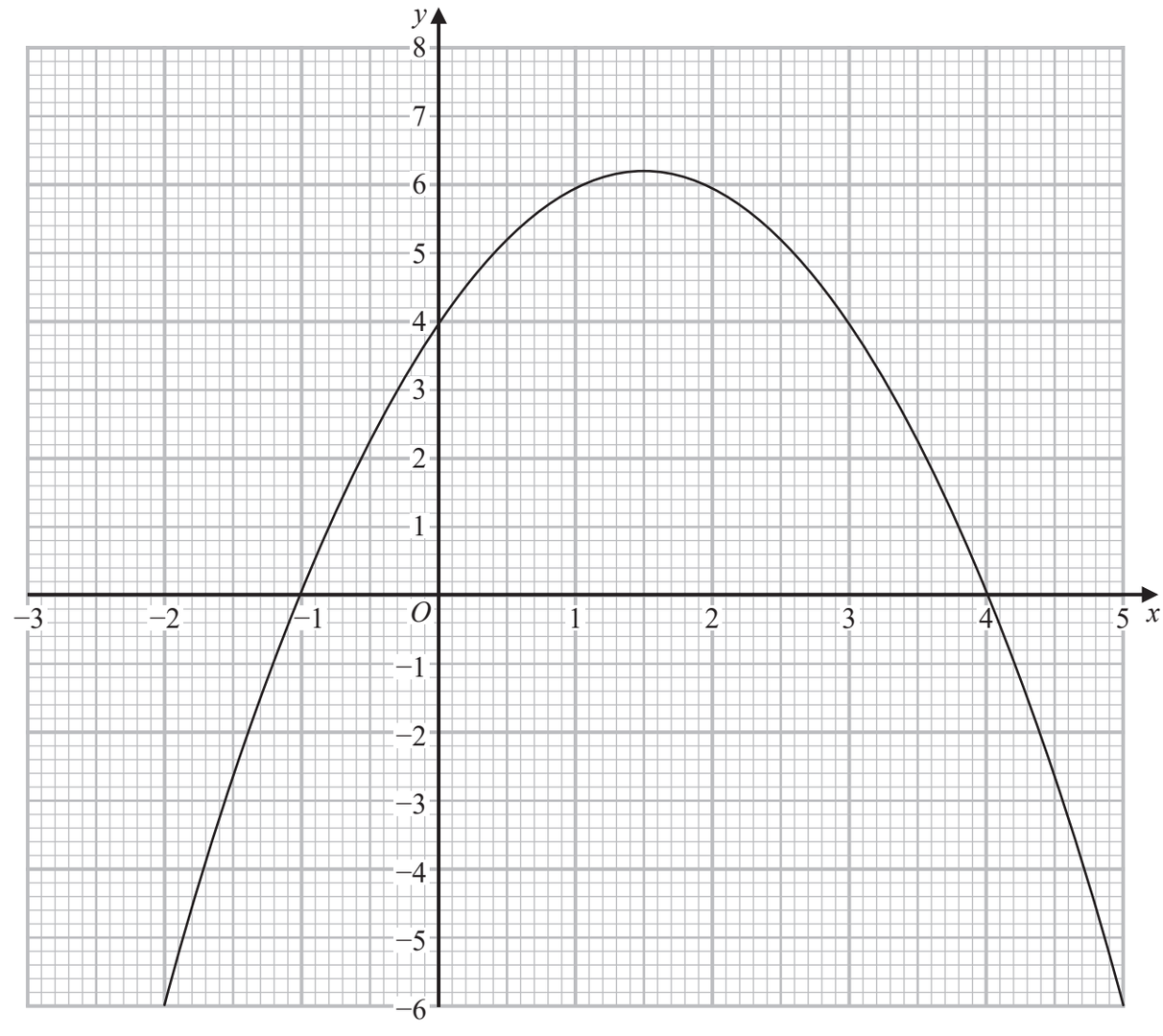
8 It takes $4\frac{3}{4}$ hours to print some letters when 7 printers are used.

Work out the time taken to print the letters when 3 printers are used.
Give your answer in hours and minutes.

..... hours ..... minutes

(Total for Question 8 is 3 marks)

9 Here is the graph of $y = 4 + 3x - x^2$ for values of x from -2 to 5



(a) Write down estimates for the coordinates of the turning point on the graph of $y = 4 + 3x - x^2$

(..... , ...)

(1)

(b) Use the graph to find estimates of the solutions to the equation $4 + 3x - x^2 = -2$

.....

(2)

(Total for Question 9 is 3 marks)

10 Peter pays £5000 for a factory machine.

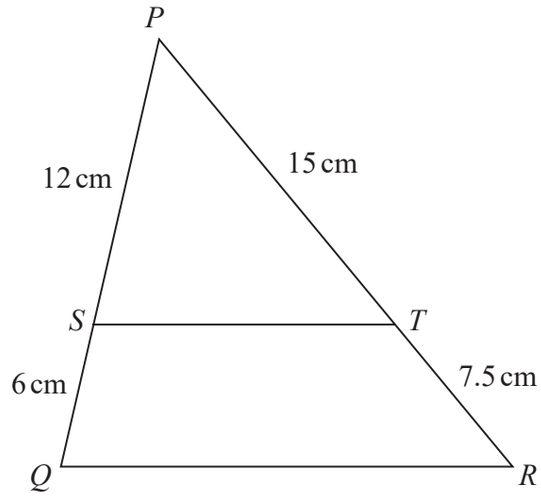
The value of the machine depreciates at a rate of x% per annum.
At the end of 6 years the value of the machine is £3493.62

Calculate the value of x.
Give your answer correct to 1 decimal place.

.....

(Total for Question 10 is 3 marks)

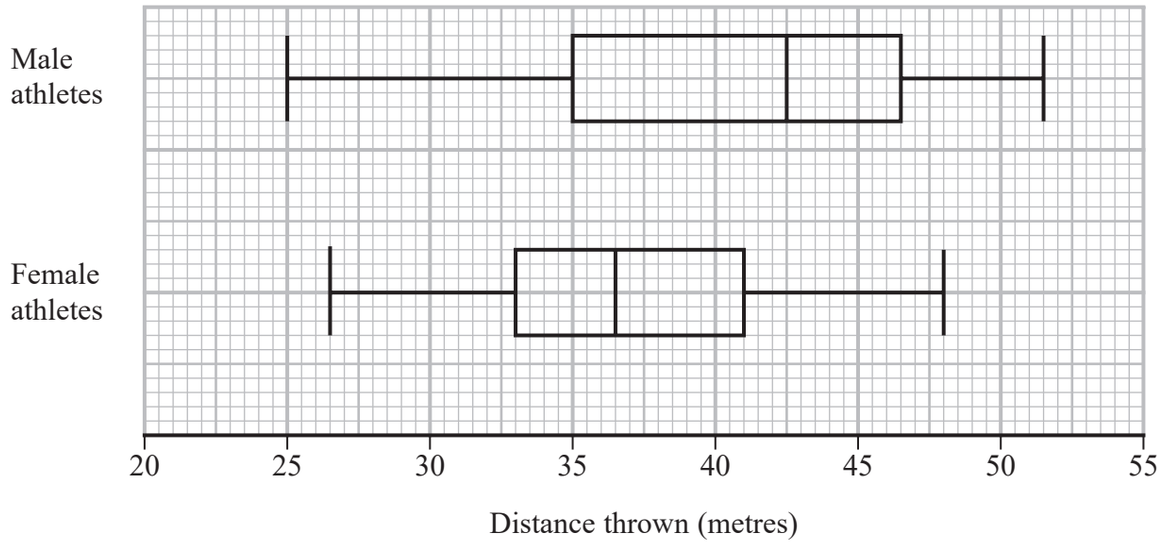
11 *PQR* and *PST* are two triangles.



Are triangle *PQR* and triangle *PST* similar?
Justify your answer.

(Total for Question 11 is 2 marks)

12 The box plots give information about the distances a javelin is thrown by 60 male athletes and by 60 female athletes.



(a) Work out the interquartile range for the distances thrown by the male athletes.

..... m

(2)

Fayha says,

"The box plots show that the male athletes threw the javelin further than the female athletes."

(b) Is Fayha correct?
Give a reason for your answer.

.....

.....

.....

(1)

(c) Work out an estimate for the number of the female athletes that threw the javelin a distance greater than 33 m.

.....

(2)

(Total for Question 12 is 5 marks)

13 Here are the first six terms of a quadratic sequence.

10 19 34 55 82 115

Find an expression, in terms of n, for the nth term of this sequence.

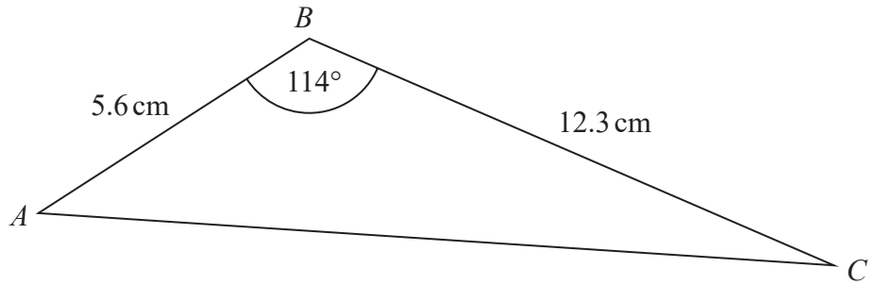
.....

(Total for Question 13 is 3 marks)

14 Show that $\frac{2x^2 + 10x - 48}{x^2 - 64}$ can be written in the form $\frac{ax + b}{cx + d}$ where a, b, c and d are integers.

(Total for Question 14 is 3 marks)

15 ABC is a triangle.



(a) Calculate the area of triangle ABC.
Give your answer correct to 3 significant figures.

..... cm^2

(2)

(b) Calculate the length of AC.
Give your answer correct to 3 significant figures.

..... cm

(3)

(Total for Question 15 is 5 marks)

16 (a) Show that the equation $5x = x^3 - 9$ can be rearranged to give $x = \sqrt[3]{9 + 5x}$

(1)

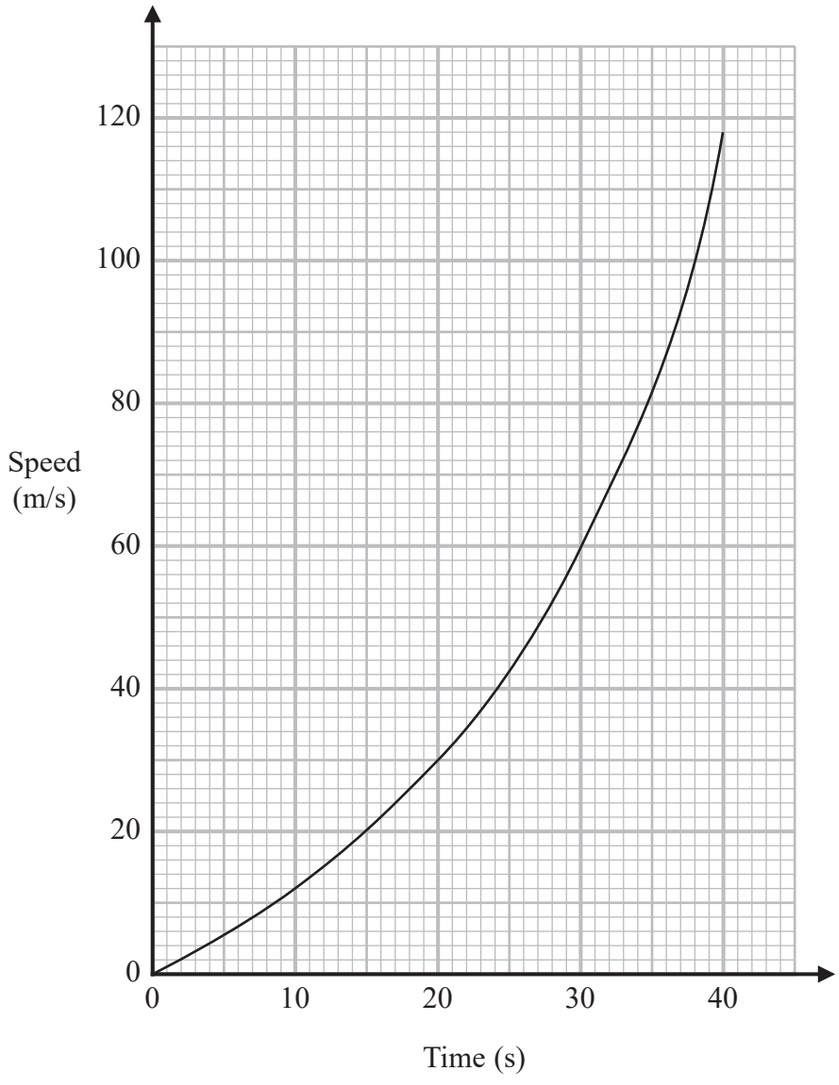
(b) Starting with $x_0 = 3$,
use the iteration formula $x_{n+1} = \sqrt[3]{9 + 5x_n}$ three times to find an estimate for a solution of $5x = x^3 - 9$
Give your answer correct to 3 decimal places.

.....

(3)

(Total for Question 16 is 4 marks)

17 Here is a speed-time graph for the first 40 seconds of an aeroplane's journey.

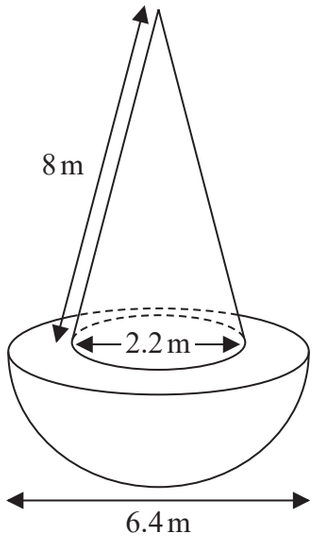


Work out an estimate for the distance the aeroplane travelled in the first 40 seconds of its journey.
Use 4 strips of equal width.

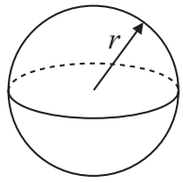
..... m

(Total for Question 17 is 3 marks)

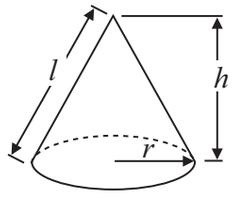
18 The centre of the base of a solid cone is placed at the centre of the flat face of a hemisphere to make a sculpture.



Surface area of sphere $= 4\pi r^2$



Curved surface area of cone $= \pi rl$



The diameter of the hemisphere is 6.4 m.
The diameter of the base of the cone is 2.2 m and the slant height of the cone is 8 m.

Callum is going to cover this sculpture with one coat of paint.
He assumes that each tin of paint will cover 8.5 m^2

Callum thinks he will need to buy 15 tins of paint.

(a) Will 15 tins of paint be enough?
You must show how you get your answer.

(5)

Callum finds out that each tin of paint will actually cover 7.5 m^2

(b) How does this affect your answer to part (a)?

.....

.....

.....

(1)

(Total for Question 18 is 6 marks)

19 200 people were asked if they like any of running, cycling or swimming.

Of these people,
8 like running, swimming and cycling
16 like running and swimming but not cycling
33 do not like any of these activities
28 like cycling and swimming
all 40 people who like cycling like at least one other activity
124 like running

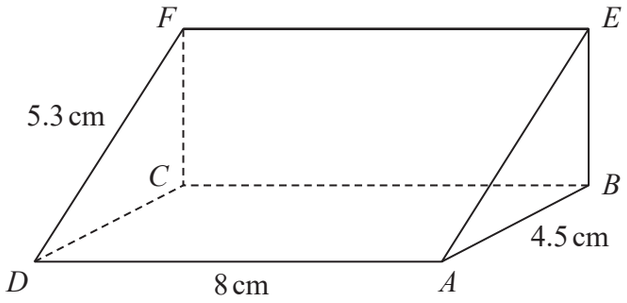
One of the people asked is chosen at random.

Given that this person likes swimming, find the probability that this person likes cycling.

.....

(Total for Question 19 is 5 marks)

20 The diagram shows a triangular prism.



The base, *ABCD*, of the prism is a rectangle.
Angle *DCF* and angle *ABE* are right angles.

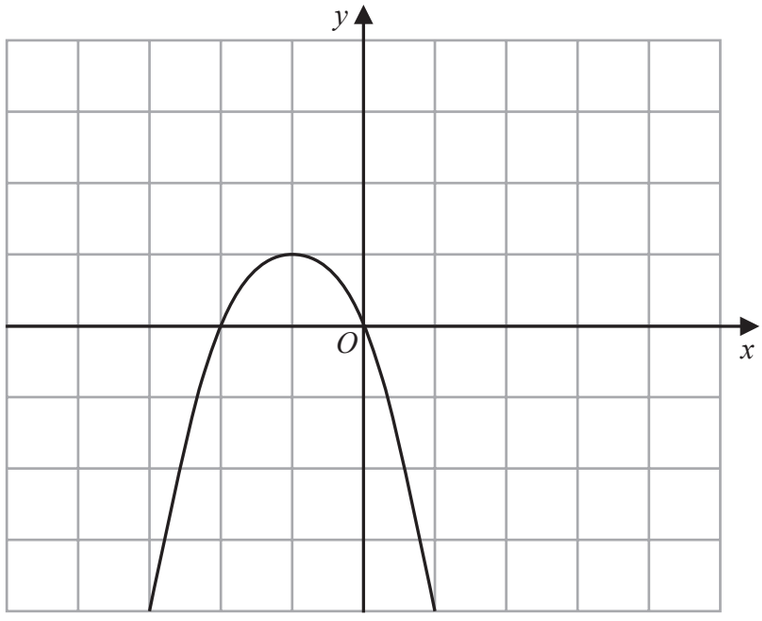
M is the point on *DA* such that *DM* : *MA* = 3 : 2

Calculate the size of the angle between *EM* and the base of the prism.
Give your answer correct to 1 decimal place.

.....°

(Total for Question 20 is 4 marks)

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



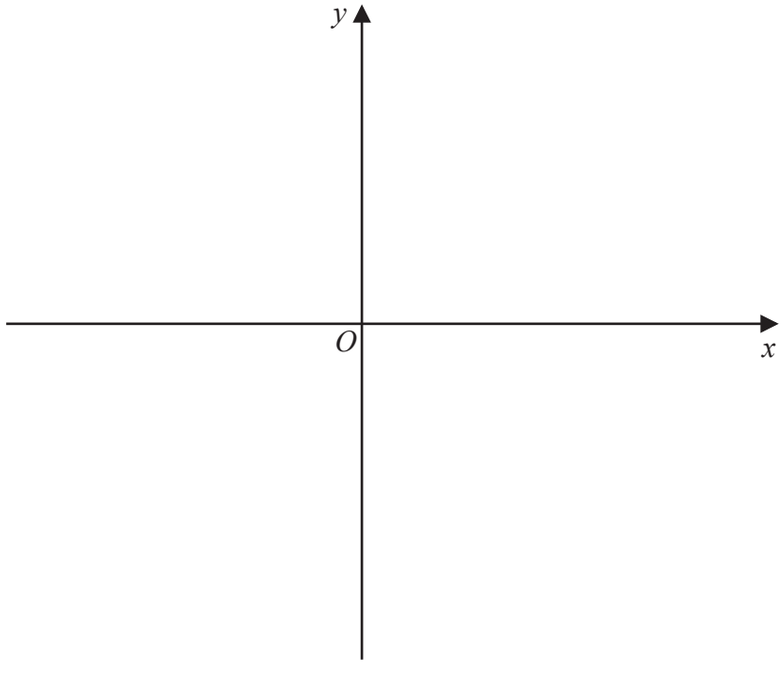
(a) On the grid above, sketch the graph of $y = -f(x)$

(1)

C is the circle with equation $x^2 + y^2 = 9$

The circle **C** is translated by the vector $\begin{pmatrix} -2 \\ 0 \end{pmatrix}$ to give circle **S**.

(b) Draw a sketch of circle **S**.
Label with coordinates the centre of circle **S** and any points of intersection with the x-axis.



(3)

T is a circle with centre (0, 0)
P is the point on **T** with coordinates (12, −9)

(c) Find an equation of the tangent to **T** at the point *P*.

.....

(3)

(Total for Question 21 is 7 marks)

TOTAL FOR PAPER IS 80 MARKS

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