

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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Aiming for 9 – Spring 2022 practice paper

Morning (Time: 1 hour 30 minutes)

Paper Reference **1MA1/2H**

Mathematics

Paper 2 (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.**



Information

- The total mark for this paper is 80. There are 21 questions.
- Questions have been arranged in an ascending order of mean difficulty, as found by Grade 7 students in June and November examinations.
- 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

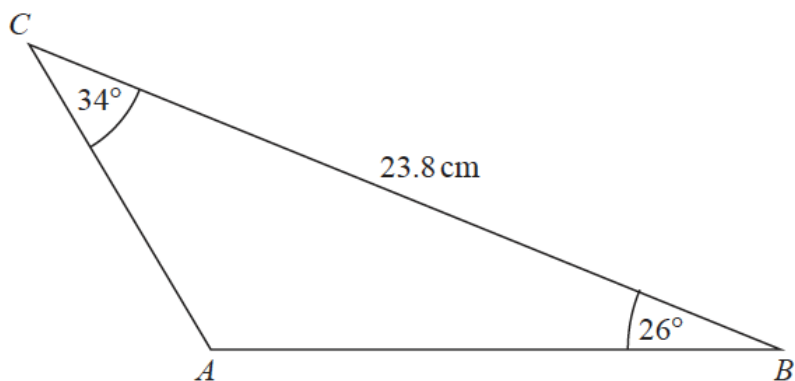
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here is triangle ABC .



Work out the length of AB .
Give your answer correct to 1 decimal place.

..... cm

(Total for Question 1 is 3 marks)

- 2 Louise invests £ x in Better Investments for 3 years.
Sadiq invests £ x in County Bank for 3 years.

Better Investments
Compound Interest
2.5% per annum

County Bank
Compound Interest
2% per annum for the first two years
3.5% per annum for each extra year

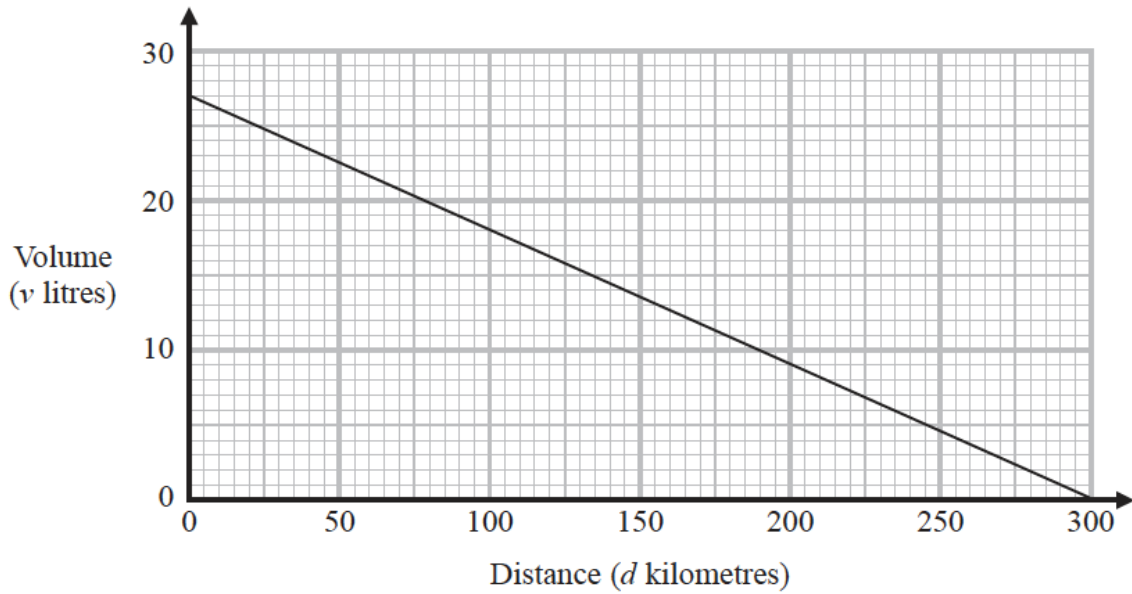
At the end of the 3 years, the value of Louise's investment is £344 605

Work out the value of Sadiq's investment at the end of the 3 years.

£.....

(Total for Question 2 is 4 marks)

- 3 The graph gives information about the volume, v litres, of petrol in the tank of Jim's car after it has travelled a distance of d kilometres.



- (a) Find the gradient of the graph.

.....
(2)

- (b) Interpret what the gradient of the graph represents.

.....

 (1)

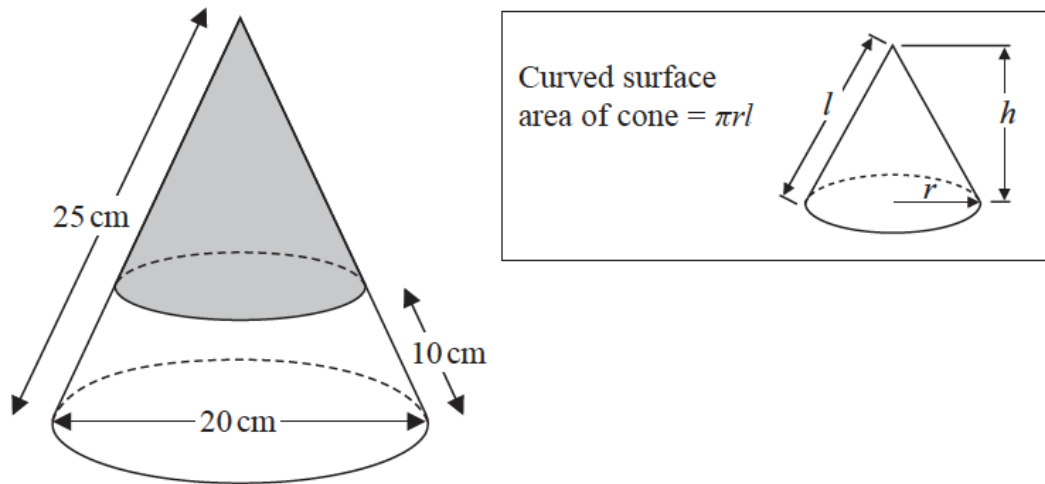
(Total for Question 3 is 3 marks)

- 4 Write down the coordinates of the turning point on the graph of $y = (x + 12)^2 - 7$

(.....,)

(Total for Question 4 is 1 mark)

5 The diagram represents a solid cone.



The cone has a base diameter of 20 cm and a slant height of 25 cm.

A circle is drawn around the surface of the cone at a slant height of 10 cm above the base. The curved surface of the cone above the circle is painted grey.

Work out the area of the curved surface of the cone that is **not** painted grey.

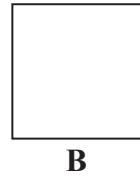
Give your answer as a multiple of π

You must show all your working.

..... cm²

(Total for Question 5 is 4 marks)

6 Here are two squares, **A** and **B**.



The length of each side of square **B** is 4 cm greater than the length of each side of square **A**.
The area of square **B** is 70 cm^2 greater than the area of square **A**.

Find the area of square **B**.

Give your answer correct to 3 significant figures.
You must show all your working.

..... cm^2

(Total for Question 6 is 4 marks)

- 7 (a) Use the iteration formula $x_{n+1} = \sqrt[3]{10 - 2x_n}$ to find the values of x_1 , x_2 and x_3
Start with $x_0 = 2$

$x_1 = \dots\dots\dots$

$x_2 = \dots\dots\dots$

$x_3 = \dots\dots\dots$

(3)

The values of x_1 , x_2 and x_3 found in part (a) are estimates of the solution of an equation of the form $x^3 + ax + b = 0$ where a and b are integers.

- (b) Find the value of a and the value of b .

$a = \dots\dots\dots$

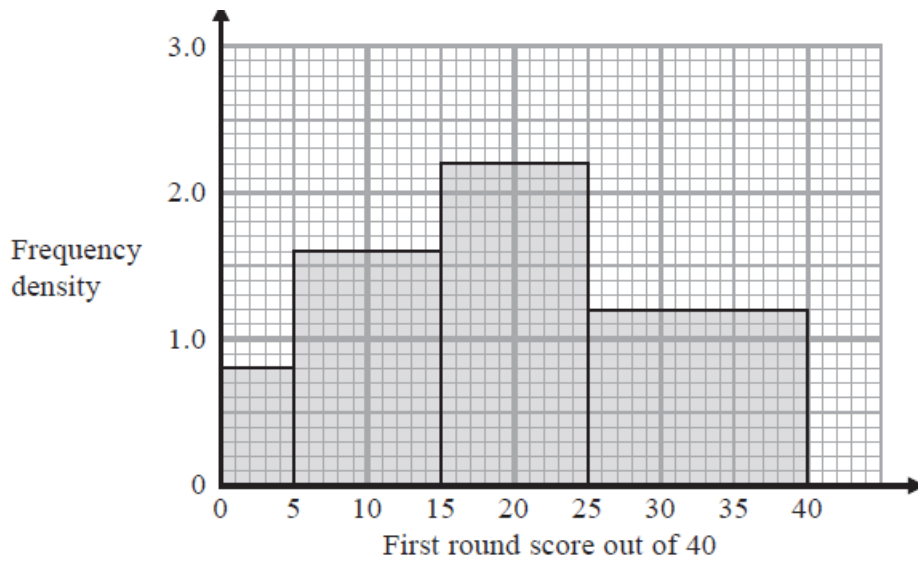
$b = \dots\dots\dots$

(1)

(Total for Question 7 is 4 marks)

8 Some people took part in the first round of a competition.

The histogram gives information about the scores of these people in the first round.

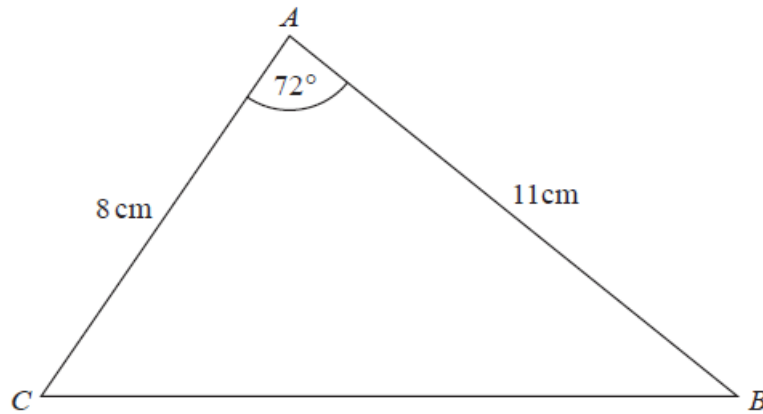


20% of the people got a score high enough for them to qualify for the second round.

Work out an estimate for the score needed to qualify for the second round.
You must show all your working.

.....
(Total for Question 8 is 4 marks)

9 Here is triangle ABC .



- (a) Find the length of BC .
Give your answer correct to 3 significant figures.

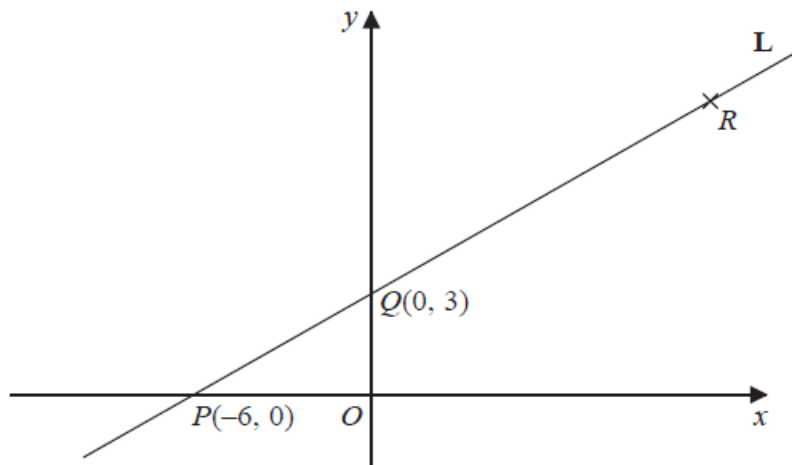
..... cm
(3)

- (b) Find the area of triangle ABC .
Give your answer correct to 3 significant figures.

..... cm²
(2)

(Total for Question 9 is 5 marks)

10 Here is a sketch of the line **L**.



The points $P(-6, 0)$ and $Q(0, 3)$ are points on the line **L**.

The point R is such that PQR is a straight line and $PQ : QR = 2 : 3$

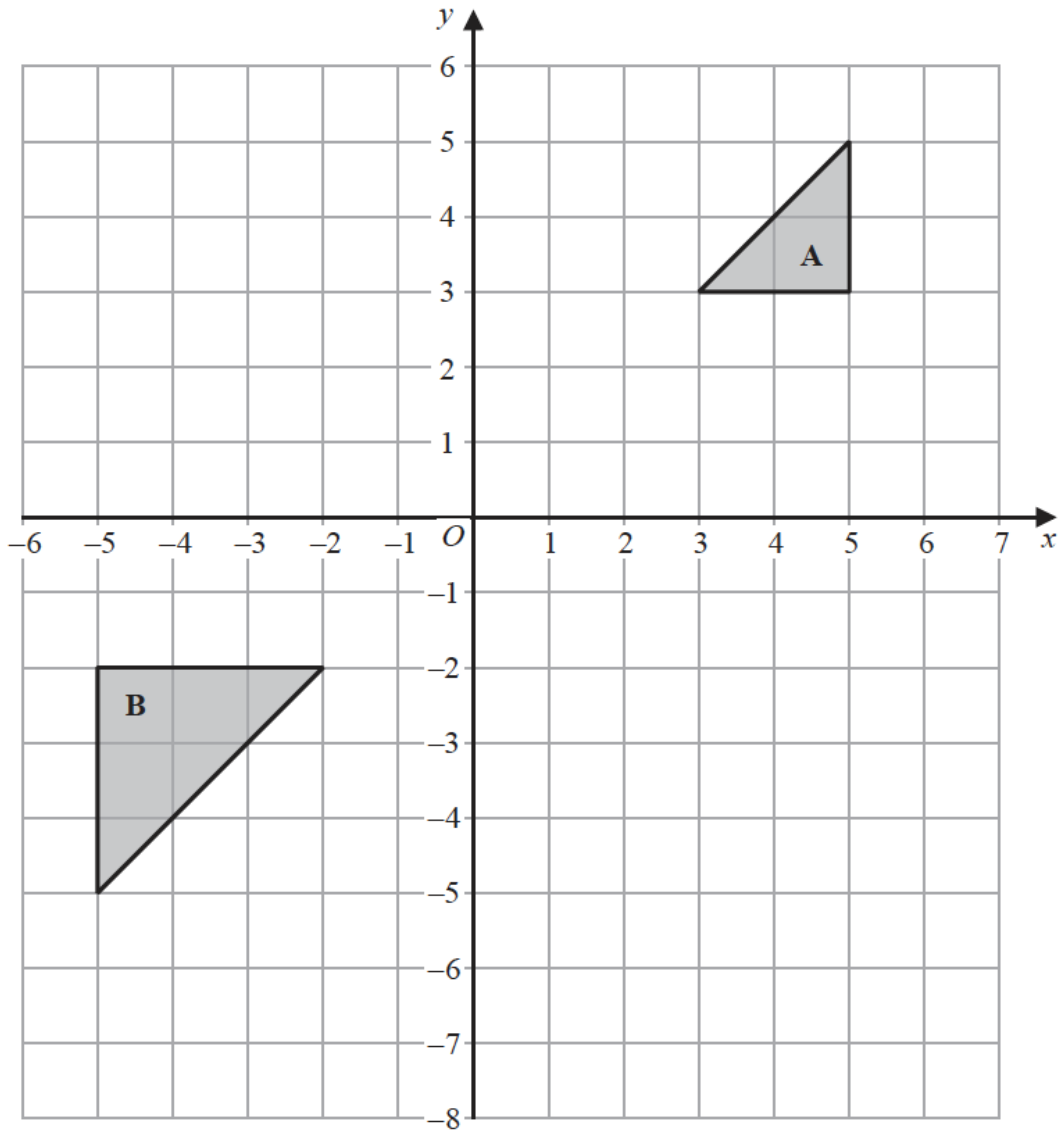
(a) Find the coordinates of R .

(.....,)
(2)

(b) Find an equation of the line that is perpendicular to **L** and passes through Q .

.....
(3)

(Total for Question 10 is 5 marks)



Describe fully the single transformation that maps triangle A onto triangle B.

.....

.....

(Total for Question 11 is 2 marks)

- 12 The grouped frequency table gives information about the time, in minutes, taken by 50 people to solve a puzzle.

Time (t minutes)	Frequency
$0 < t \leq 10$	5
$10 < t \leq 20$	8
$20 < t \leq 30$	12
$30 < t \leq 40$	15
$40 < t \leq 50$	7
$50 < t \leq 60$	3

Brian was asked to draw a cumulative frequency table for this information.

This is the table that Brian drew.

Time (t minutes)	Cumulative frequency
$0 < t \leq 10$	5
$10 < t \leq 20$	13
$20 < t \leq 30$	25
$30 < t \leq 40$	40
$40 < t \leq 50$	47
$50 < t \leq 60$	50

Write down **one** thing that is wrong with this cumulative frequency table.

.....

.....

.....

(Total for Question 12 is 1 mark)

13 In a village,

if it rains on one day, the probability that it will rain on the next day is 0.8

if it does **not** rain on one day, the probability that it will rain on the next day is 0.6

A weather forecaster says,

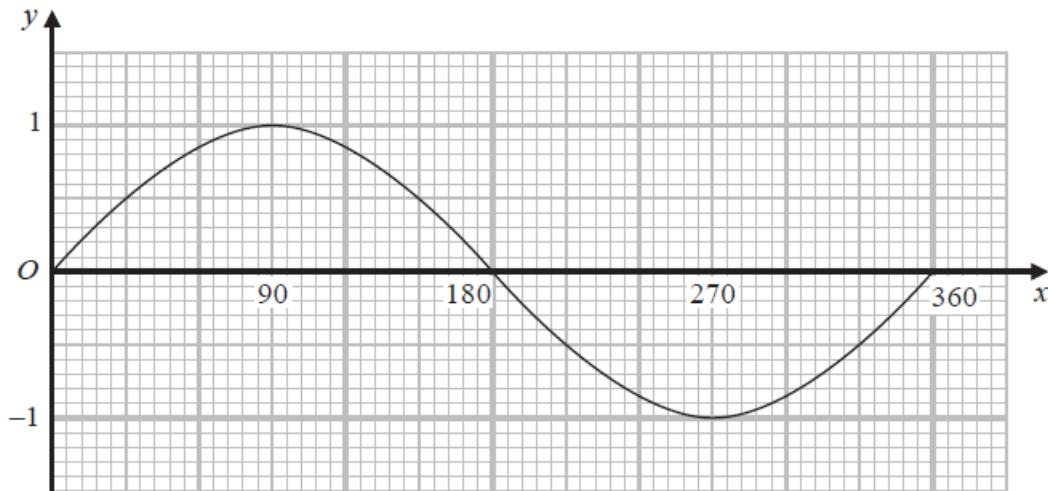
“There is a 70% chance that it will rain in the village on Monday.”

Work out an estimate for the probability that it will rain in the village on Wednesday.

You must show all your working.

.....
(Total for Question 13 is 4 marks)

14 Here is a graph of $y = \sin x^\circ$ for $0 \leq x \leq 360$



(a)

Using this graph, find estimates of all **four** solutions of

$$\sin x^\circ = 0.6 \text{ for } 0 \leq x \leq 720$$

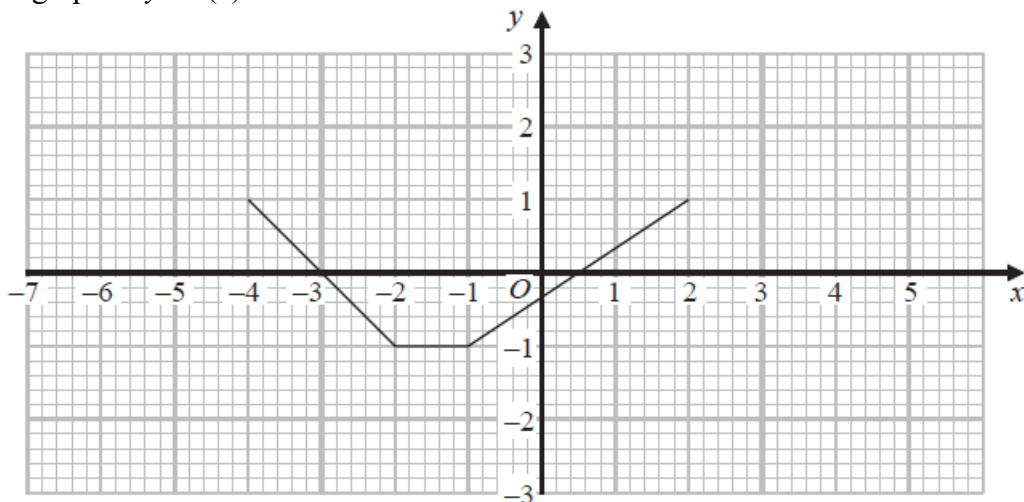
..... (2)

The graph of $y = \sin x^\circ$ is reflected in the x -axis.

(b) Write down an equation of the reflected graph.

..... (1)

Here is a graph of $y = f(x)$

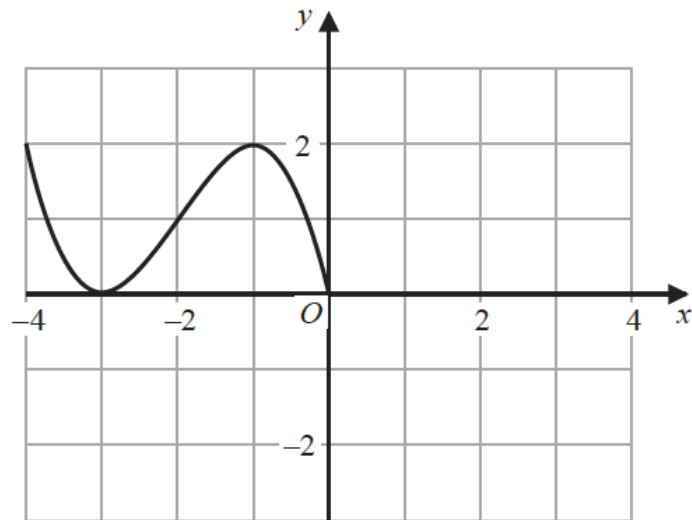


(c) On the grid, draw the graph of $y = f(x - 2)$

(1)

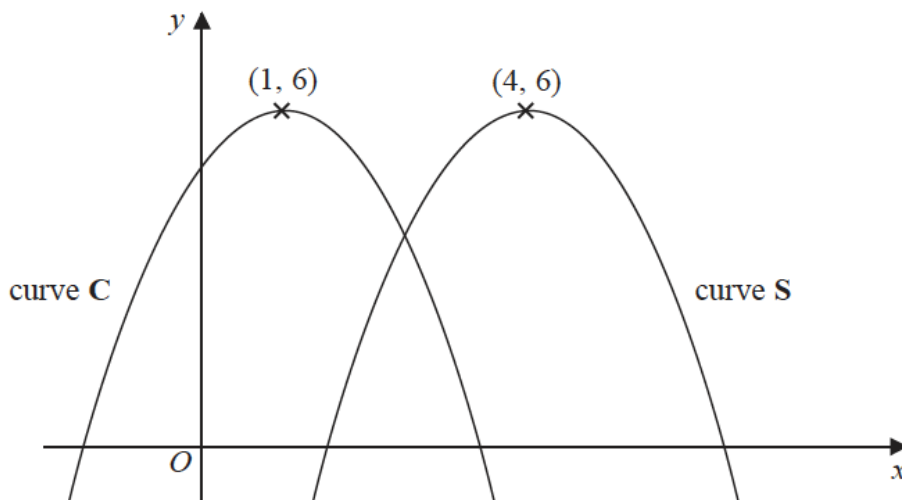
(Total for Question 14 is 4 marks)

15 The graph of the curve with equation $y = f(x)$ is shown on the grid below.



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

(2)



The curve **C** with equation $y = 5 + 2x - x^2$ is transformed by a translation to give the curve **S** such that the point $(1, 6)$ on **C** is mapped to the point $(4, 6)$ on **S**.

(b) Find an equation for **S**.

.....
(2)

(Total for Question 15 is 4 marks)

16 There are only red sweets and yellow sweets in a bag.

There are n red sweets in the bag.

There are 8 yellow sweets in the bag.

Sajid is going to take at random a sweet from the bag and eat it.

He says that the probability that the sweet will be red is $\frac{7}{10}$

(a) Show why the probability cannot be $\frac{7}{10}$

(3)

After Sajid has taken the first sweet from the bag and eaten it, he is going to take at random a second sweet from the bag.

Given that the probability that both the sweets he takes will be red is $\frac{3}{5}$

(b) work out the number of red sweets in the bag.
You must show all your working.

.....
(5)

(Total for Question 16 is 8 marks)

17 **A, B** and **C** are three spheres.

The volume of sphere **A** is 125 cm^3

The volume of sphere **B** is 27 cm^3

The ratio of the radius of sphere **B** to the radius of sphere **C** is $1 : 2$

Work out the ratio of the surface area of sphere **A** to the surface area of sphere **C**.

.....
(Total for Question 17 is 3 marks)

- 18** **C** is a circle with centre the origin.
A tangent to **C** passes through the points $(-20, 0)$ and $(0, 10)$
Work out an equation of **C**.
You must show all your working.

.....
(Total for Question 18 is 5 marks)

- 19** A hot air balloon is descending.
The height of the balloon n minutes after it starts to descend is h_n metres.
The height of the balloon $(n + 1)$ minutes after it starts to descend, $h_{n + 1}$ metres, is given by

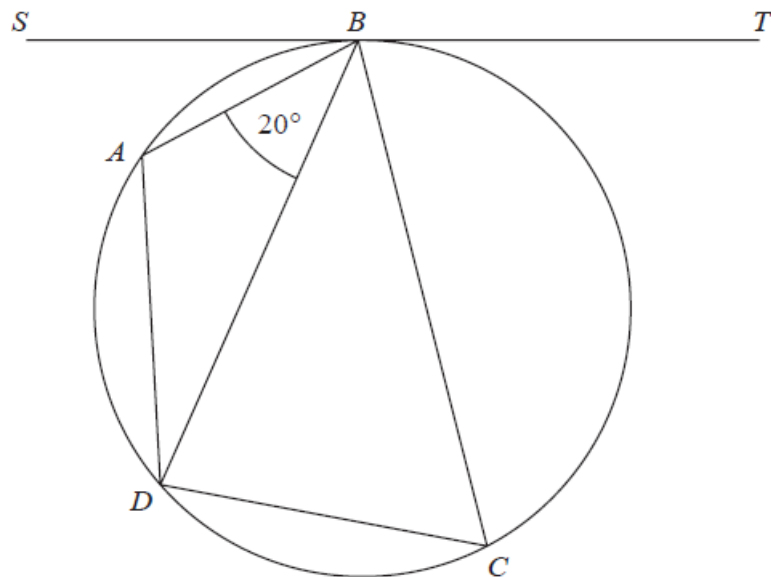
$$h_{n+1} = K \times h_n + 20 \quad \text{where } K \text{ is a constant.}$$

The balloon starts to descend from a height of 1200 metres at 09 15
At 09 16 the height of the balloon is 1040 metres.

Work out the height of the balloon at 09 18

..... m

(Total for Question 19 is 4 marks)



A , B , C and D are four points on a circle.
 SBT is a tangent to the circle.
 Angle $ABD = 20^\circ$

the size of angle BAD : the size of angle $BCD = 3 : 1$

Find the size of angle SBA .
 Give a reason for each stage of your working.

.....^o
(Total for Question 20 is 4 marks)

21 The time period, T seconds, of a simple pendulum of length l cm is given by the formula

$$T = 2\pi\sqrt{\frac{l}{g}}$$

Katie uses a simple pendulum in an experiment to find an estimate for the value of g .

Here are her results.

$l = 52.0$ correct to 3 significant figures.

$T = 1.45$ correct to 3 significant figures.

Work out the upper bound and the lower bound for the value of g .

Use $\pi = 3.142$

You must show all your working.

upper bound =

lower bound =

(Total for Question 21 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS