

Name

Class

Predicted Paper 2

June 2014

Higher Tier

Edexcel Style

Calculator allowed

by

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Time 1 Hour 45 Minutes
Marks Available 100

The quality of written communication is specifically assessed. These questions are indicated by an asterisk (*)

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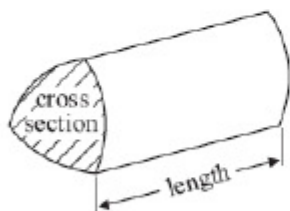
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GCSE Mathematics IMA0

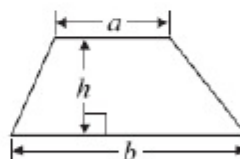
Formulae: Higher Tier

**You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.**

Volume of prism = area of cross section \times length

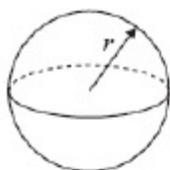


Area of trapezium = $\frac{1}{2} (a + b)h$



Volume of sphere = $\frac{4}{3} \pi r^3$

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

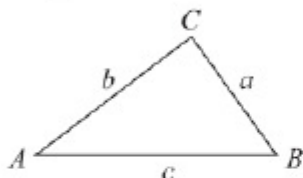


Volume of cone = $\frac{1}{3} \pi r^2 h$

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



In any triangle ABC



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2} ab \sin C$

Question 1

A bag contains counters which are red or green or yellow or blue.

The table shows each of the probabilities that a counter taken at random from the bag will be red or green or blue.

Colour	Red	Green	Yellow	Blue
Probability	0.2	0.3		0.1

A counter is to be taken at random from the bag.

- (a) Work out the probability that the counter will be yellow.

.....
(2)

The bag contains 200 counters.

- (b) Work out the number of red counters in the bag.

.....
(2)

(Total 4 marks)

Question 2

Here are the first 4 terms of an arithmetic sequence.

2 5 8 11

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

.....
(Total 2 marks)

Question 3

. Here are the ages, in years, of 15 teachers.

35 52 42 27 36

23 31 41 50 34

44 28 45 45 53

- (a) Draw an ordered stem and leaf diagram to show this information.
You must include a key.



Key:

(3)

One of these teachers is picked at random.

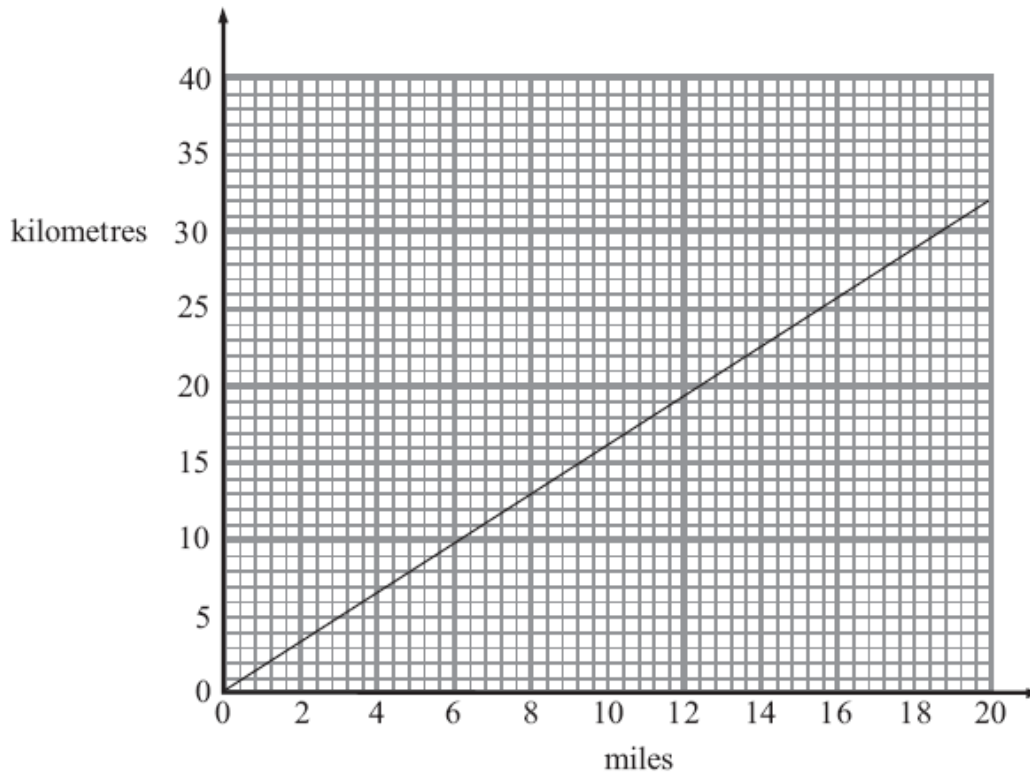
- (b) Work out the probability that this teacher is more than 40 years old.

.....
(2)

(Total 5 marks)

Question 4

The graph can be used for changing between miles and kilometres.



(a) Use the graph to change 12 miles to kilometres.

..... kilometres
(1)

(b) Use the graph to change 10 kilometres to miles.

..... miles
(1)

Matthew travelled 100 miles.

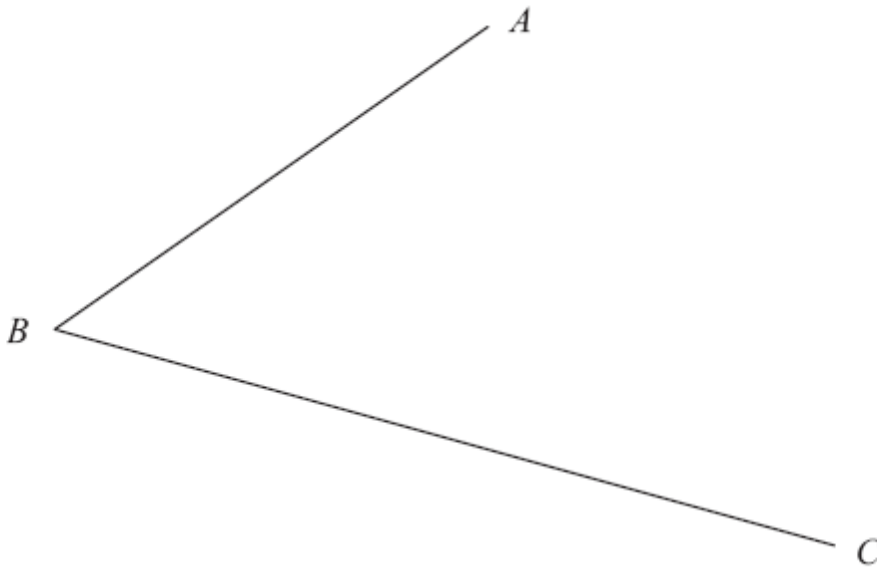
(c) Change 100 miles to kilometres.

..... kilometres
(2)

(Total 4 marks)

Question 5

Use ruler and compasses to construct the bisector of angle ABC .
You must show all your construction lines.



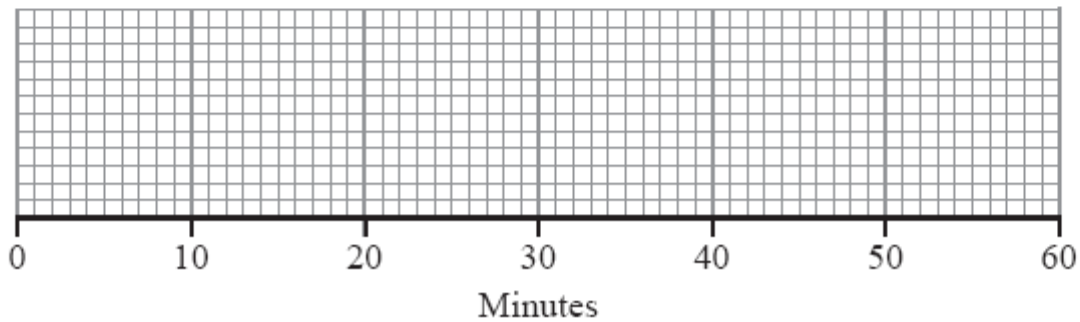
(Total 2 marks)

Question 6

Mrs Raja set work for the students in her class.
She recorded the time taken, in minutes, for each student to do the work.
She used her results to work out the information in the table.

	Minutes
Shortest time	4
Lower quartile	14
Median	26
Upper quartile	30
Longest time	57

On the grid, draw a box plot to show the information in the table.



(Total 2 marks)

Question 7

Jamie goes on holiday to Florida.
The exchange rate is £1 = 1.70 dollars.

He changes £900 into dollars.

(a) How many dollars should he get?

..... dollars
(2)

After his holiday Jamie changes 160 dollars back into pounds.
The exchange rate is still £1 = 1.70 dollars.

(b) How much money should he get?
Give your answer to the nearest penny.

£
(2)

(Total 4 marks)

Question 8

(a)

Use your calculator to work out

$$\frac{13.7 + 5.86}{2.54 \times 3.17}$$

Write down all the figures on your calculator display.
You must give your answer as a decimal.

.....
(2)

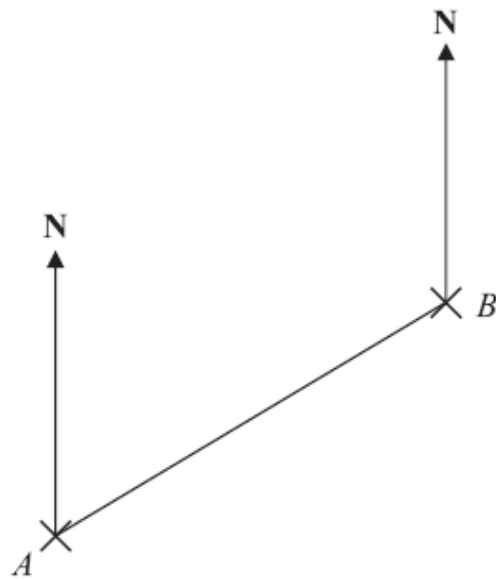
(b) Give your answer to part (a) to 1 significant figure

.....
(1)

(Total 3 marks)

Question 9

The diagram shows the positions of two telephone masts, *A* and *B*, on a map.



(a) Measure the bearing of *B* from *A*.

.....^o
(1)

Another mast *C* is on a bearing of 160° from *B*.
On the map, *C* is 4 cm from *B*.

(b) Mark the position of *C* with a cross (×) and label it *C*.

(2)

(Total 3 marks)

Question 10

A plane flies 1400 kilometres in 2 hours 20 minutes.

Calculate the average speed, in km/h, of the plane.

..... km/h

(Total 3 marks)

Question 11

Here is a diagram of Jim's garden.

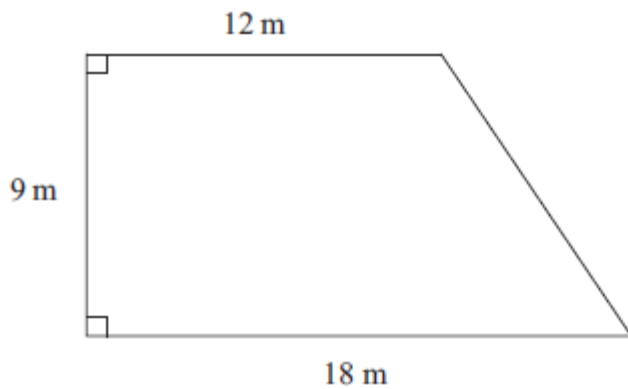


Diagram **NOT**
accurately drawn

Jim wants to cover his garden with grass seed to make a lawn.

Grass seed is sold in bags.

There is enough grass seed in each bag to cover 20 m^2 of garden.

Each bag of grass seed costs £4.99

Work out the least cost of putting grass seed on Jim's garden.

£

(Total 4 marks)

Question 12

In 2003 the population of Great Britain was 6.0×10^7

In 2003 the population of India was 9.9×10^8

- (a) Work out the difference between the population of India and the population of Great Britain in 2003.
Give your answer in standard form.

.....
(2)

In 1933 the population of Great Britain was 4.5×10^7

- (b) Calculate the percentage increase in the population of Great Britain from 1933 to 2003.
Give your answer correct to one decimal place.

..... %
(3)

(Total 5 marks)

Question 13

The equation $x^3 - 5x = 60$ has a solution between 4 and 5

Find this solution and give your answer correct to 1 decimal place.
You must show **all** your working.

$x = \dots\dots\dots$

(Total 4 marks)

Question 14

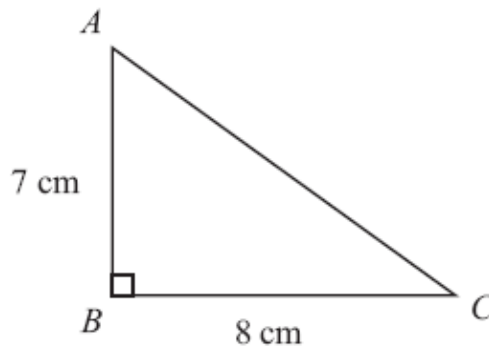


Diagram NOT
accurately drawn

ABC is a right-angled triangle.
 $AB = 7$ cm,
 $BC = 8$ cm.

Work out the length of AC .
Give your answer correct to 2 decimal places.

..... cm

(Total 3 marks)

Question 15

Henry is thinking about having a water meter.

These are the two ways he can pay for the water he uses.

Water Meter

A charge of £28.20 per year

plus

91.22p for every cubic metre of water used

1 cubic metre = 1000 litres

No Water Meter

A charge of £107 per year

Henry uses an average of 180 litres of water each day.

Henry wants to pay as little as possible for the water he uses.
Should Henry have a water meter?

(Total 5 marks)

Question 16

The table gives information about the times, in minutes, that 106 shoppers spent in a supermarket.

Time (t minutes)	Frequency	
$0 < t \leq 10$	20	
$10 < t \leq 20$	17	
$20 < t \leq 30$	12	
$30 < t \leq 40$	32	
$40 < t \leq 50$	25	

(a) Find the class interval that contains the median.

.....
(1)

(b) Calculate an estimate for the mean time that the shoppers spent in the supermarket.
Give your answer correct to 3 significant figures.

..... minutes
(4)

(Total 5 marks)

Question 17

On July 1st 2004, Jack invested £2000 at 5% per annum compound interest.

Work out the value of Jack's investment on July 1st 2006

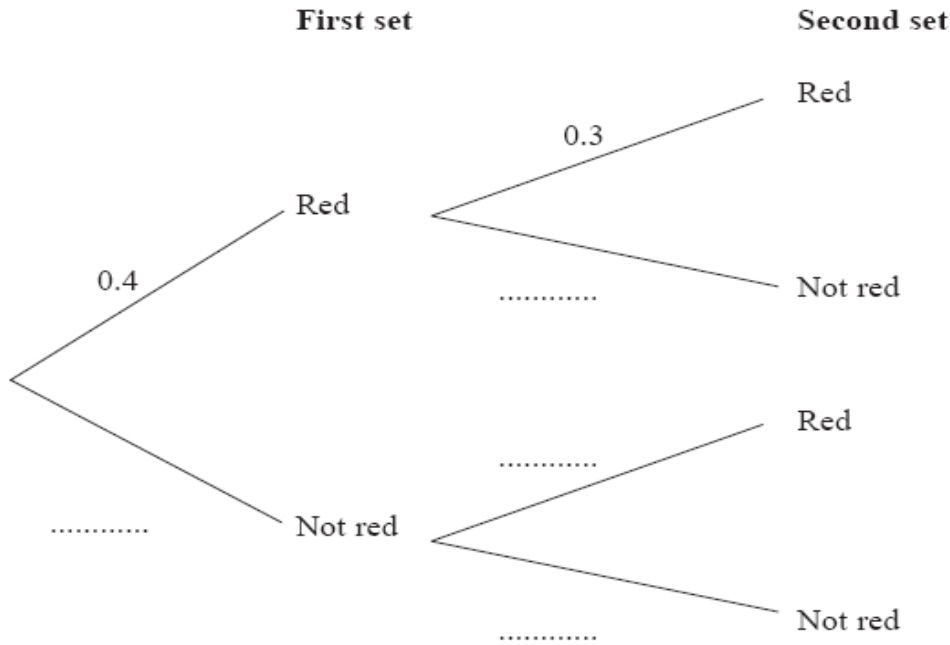
£

(Total 3 marks)

Question 18

There are two sets of traffic lights on Georgina's route to school.
The probability that the first set of traffic lights will be red is 0.4
The probability that the second set of traffic lights will be red is 0.3

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that both sets of traffic lights will be red.

.....
(2)

(c) Work out the probability that exactly one set of traffic lights will be red.

.....
(3)

(Total 7 marks)

Question 19

In a spring, the tension (T newtons) is directly proportional to its extension (x cm).

When the tension is 150 newtons, the extension is 6 cm.

(a) Find a formula for T in terms of x .

$$T = \dots\dots\dots$$

(3)

(b) Calculate the tension, in newtons, when the extension is 15 cm.

$\dots\dots\dots$ newtons

(1)

(c) Calculate the extension, in cm, when the tension is 600 newtons.

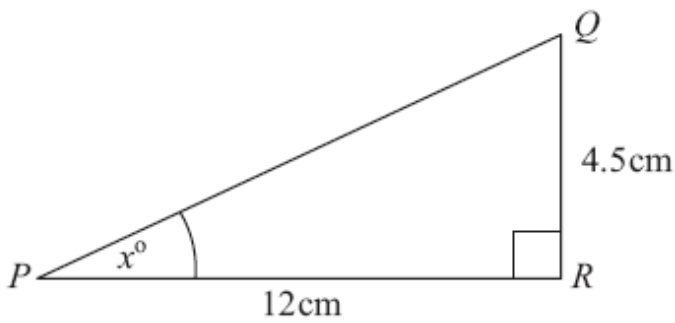
$\dots\dots\dots$ cm

(1)

(Total 5 marks)

Question 20

Diagram **NOT**
accurately drawn



PQR is a right-angled triangle.

$PR = 12\text{ cm}$.

$QR = 4.5\text{ cm}$.

Angle $PRQ = 90^\circ$.

Work out the value of x .

Give your answer correct to one decimal place.

$x = \dots\dots\dots$

(Total 3 marks)

Question 21

Solve the equation

$$\frac{x}{2x-3} + \frac{4}{x+1} = 1$$

$x = \dots\dots\dots$

(Total 5 marks)

Question 22

In a sale, normal prices are reduced by 25%.
The sale price of a saw is £12.75

Calculate the normal price of the saw.

£

(Total 3 marks)

Question 23

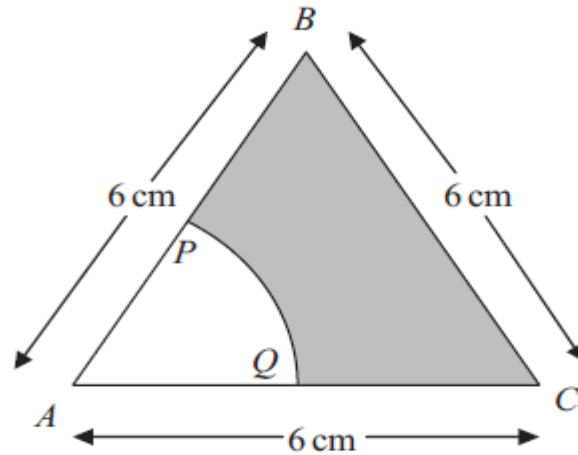


Diagram **NOT**
accurately drawn

The diagram shows an equilateral triangle ABC with sides of length 6 cm.

P is the midpoint of AB .

Q is the midpoint of AC .

APQ is a sector of a circle, centre A .

Calculate the area of the shaded region.

Give your answer correct to 3 significant figures.

..... cm²

(Total 4 marks)

Question 24

The mass M grams of a cube with edges of length L cm and density D grams per cm^3 is given by the formula

$$M = DL^3$$

$D = 8$ correct to 1 significant figure.

$L = 6.4$ correct to 1 decimal place.

Calculate the upper bound of M .

Give your answer correct to 2 significant figures.

.....

(Total 3 marks)

Question 25

(a) Simplify $\frac{x^2}{x^2 - 2x}$

.....
(2)

(b) Simplify $\frac{2}{2x-1} - \frac{1}{x+1}$

.....
(4)

(Total 6 marks)

Question 26

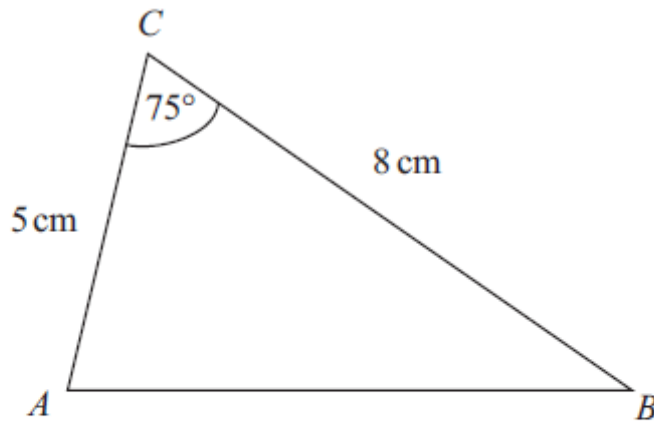


Diagram **NOT**
accurately drawn

In triangle ABC ,

$$AC = 5 \text{ cm.}$$

$$BC = 8 \text{ cm.}$$

$$\text{Angle } ACB = 75^\circ.$$

Calculate the length of AB .

Give your answer correct to 3 significant figures.

..... cm

(3)

(Total 3 marks)

END OF QUESTIONS