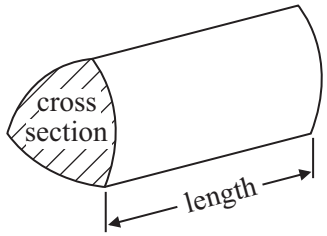
2016 Calculator Test 2 Name: _____

GCSE Mathematics 1MA0

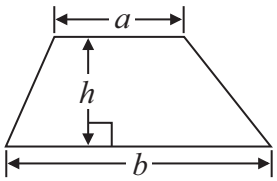
Formulae: Higher Tier

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 × length

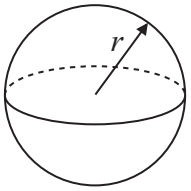


Area of trapezium = $\frac{1}{2}(a + b)h$



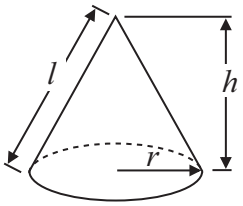
Volume of sphere = $\frac{4}{3}\pi r^3$

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

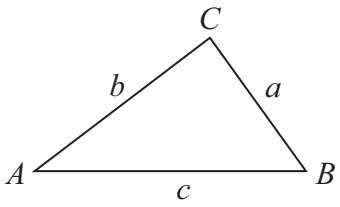


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



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 = $\frac{1}{2}ab \sin C$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Use a calculator to work out

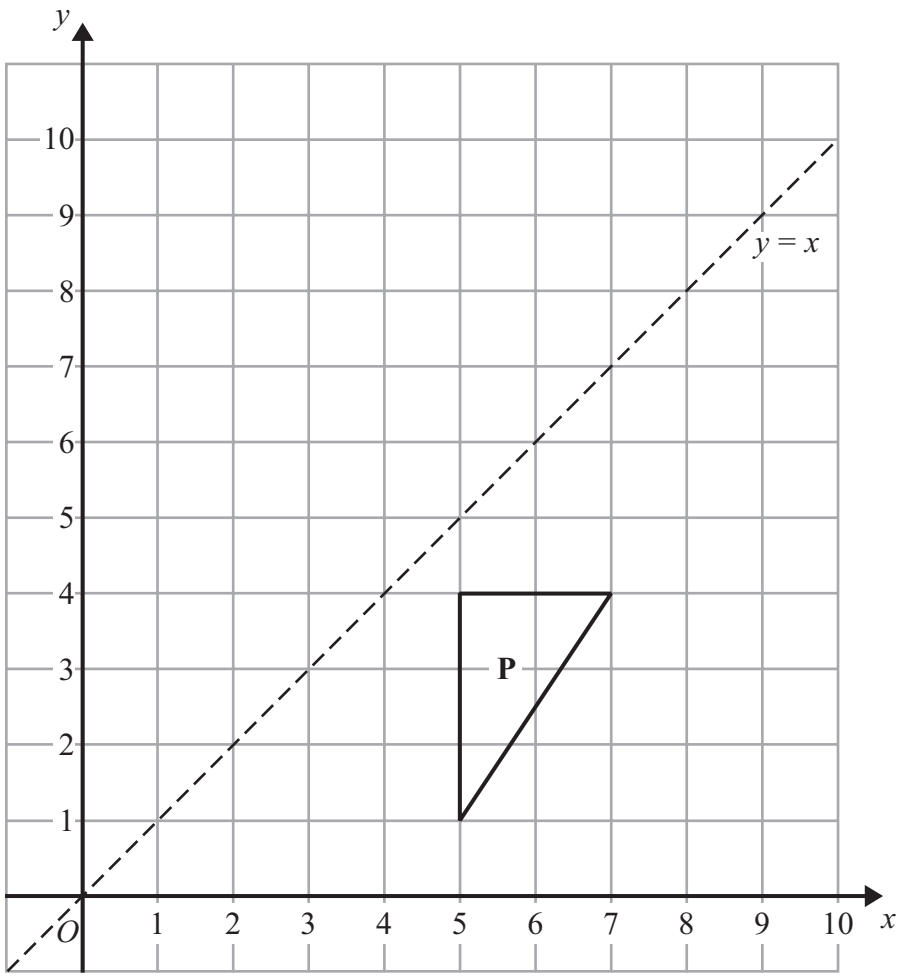
$$\frac{\sqrt{20.4}}{6.2 \times 0.48}$$

Write down all the figures on your calculator display.
Give your answer as a decimal.

.....

(Total for Question 1 is 2 marks)

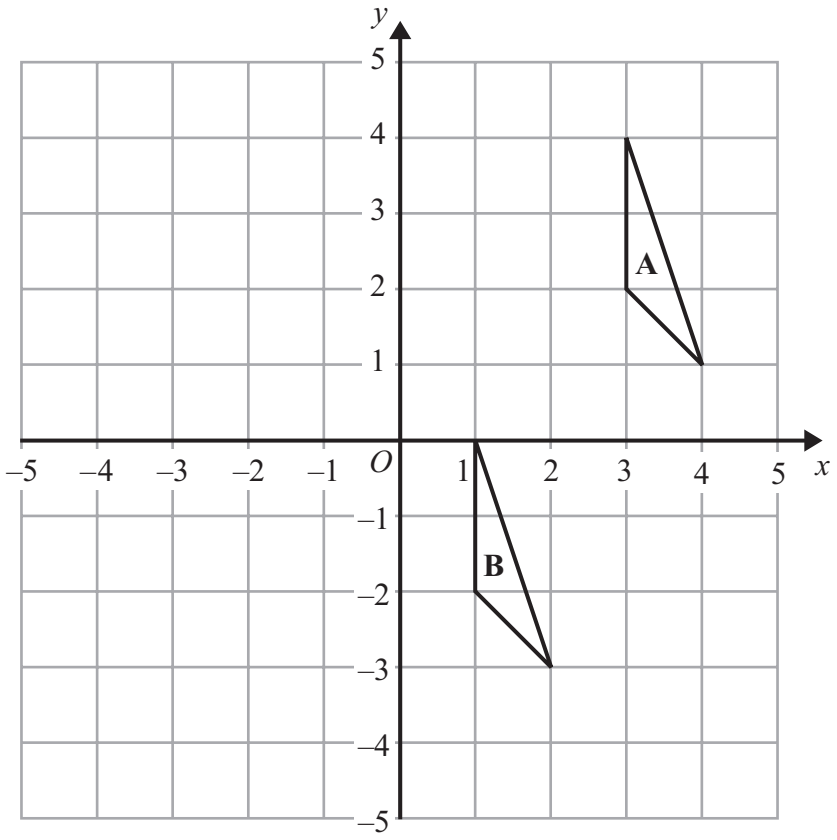
2 (a)



Reflect shape **P** in the line $y = x$

(2)

(b)



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

.....

.....

(2)

(Total for Question 2 is 4 marks)

***3** A company sells boxes to factories.
Fred buys boxes.
The boxes are sold in packs of 1000
Each pack costs £193.86

Fred orders 3 packs of boxes.
He gets a discount on his total order.

The table shows the discount he will get.

Total Order	Discount
£100 - £300	5%
£301 - £400	10%
£401 and above	15%

Work out the total cost of the order after the discount.
You must show your working.

(Total for Question 3 is 5 marks)

***4**

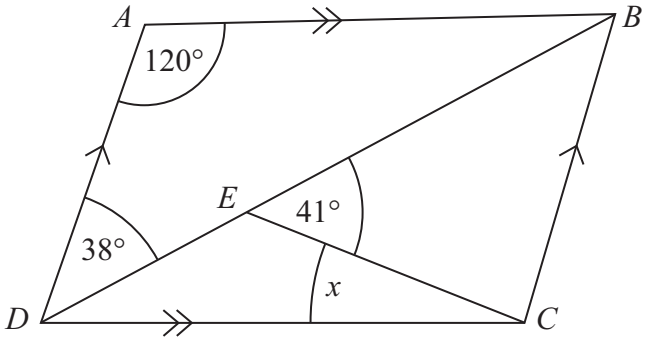


Diagram **NOT** accurately drawn

ABCD is a parallelogram.

Angle *ADB* = 38°.
Angle *BEC* = 41°.
Angle *DAB* = 120°.

Calculate the size of angle *x*.
You must give reasons for your answer.

(Total for Question 4 is 4 marks)

5 160 cm of gold wire has a weight of 17.8 grams.

Work out the weight of 210 cm of the gold wire.

..... grams

(Total for Question 5 is 3 marks)

6 (a) n is an integer.

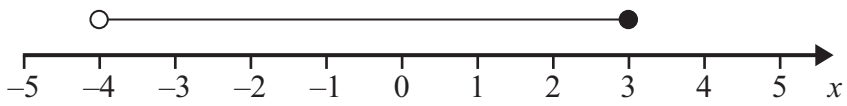
$-1 \leqslant n < 4$

List the possible values of n.

.....

(2)

(b)



Write down the inequality shown in the diagram.

.....

(2)

(c) Solve $3y - 2 > 5$

.....

(2)

(Total for Question 6 is 6 marks)

7 The stem and leaf diagram gives information about the numbers of tomatoes on 31 tomato plants.

0	8	8	9				
1	1	1	5	5			
2	1	2	2	6	7	8	8
3	0	2	5	5	7	9	
4	2	2	3	5	8	8	
5	1	1	3	4	7		

Key: 5 | 7 = 57 tomatoes

(a) Work out the median.

.....

(1)

(b) Work out the interquartile range.

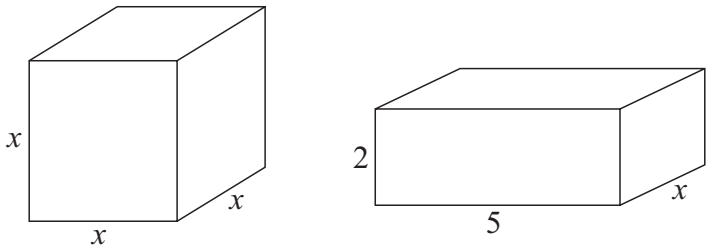
.....

(2)

(Total for Question 7 is 3 marks)

8 The diagram shows a cube and a cuboid.

Diagram **NOT** accurately drawn



All the measurements are in cm.
The volume of the cube is 100 cm^3 more than the volume of the cuboid.

(a) Show that $x^3 - 10x = 100$

(2)

(b) Use a trial and improvement method to find the value of x.
Give your answer correct to 1 decimal place.
You must show **all** your working.

$x =$ .....

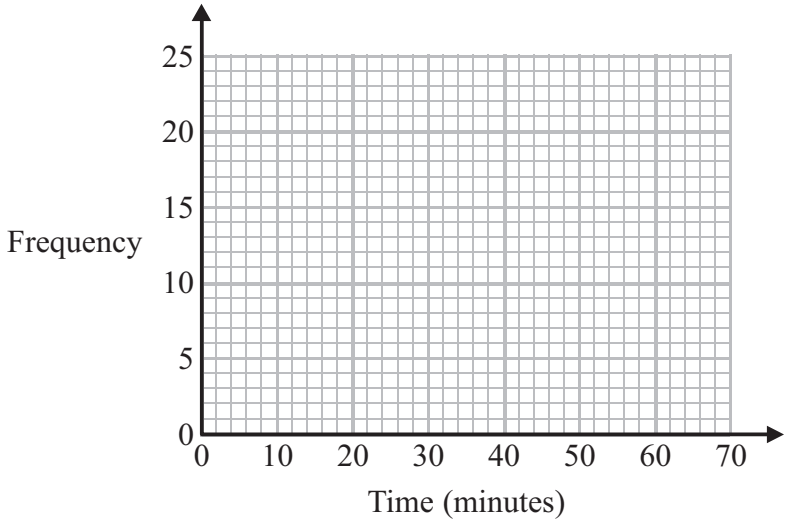
(4)

(Total for Question 8 is 6 marks)

8. The frequency table gives information about the times it took some office workers to get to the office one day.

Time (t minutes)	Frequency
$0 < t \leqslant 10$	4
$10 < t \leqslant 20$	8
$20 < t \leqslant 30$	14
$30 < t \leqslant 40$	16
$40 < t \leqslant 50$	6
$50 < t \leqslant 60$	2

(a) Draw a frequency polygon for this information.



(2)

(b) Write down the modal class interval.

.....

(1)

One of the office workers is chosen at random.

(c) Work out the probability that this office worker took more than 40 minutes to get to the office.

.....

(2)

(Total for Question 8 is 5 marks)

9 The diagram shows a solid triangular prism.

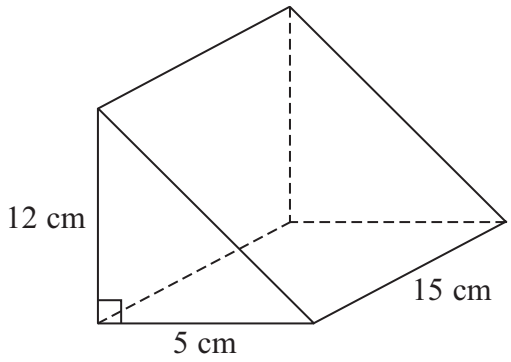


Diagram **NOT** accurately drawn

The prism is made from metal.
The density of the metal is 6.6 grams per cm^3.

Calculate the mass of the prism.

..... grams

(Total for Question 9 is 3 marks)

10 (a) Factorise $x^2 + 7x$

.....

(1)

(b) Factorise $y^2 - 10y + 16$

.....

(2)

*(c) (i) Factorise $2t^2 + 5t + 2$

.....

(ii) t is a positive whole number.

The expression $2t^2 + 5t + 2$ can never have a value that is a prime number.

Explain why.

.....

.....

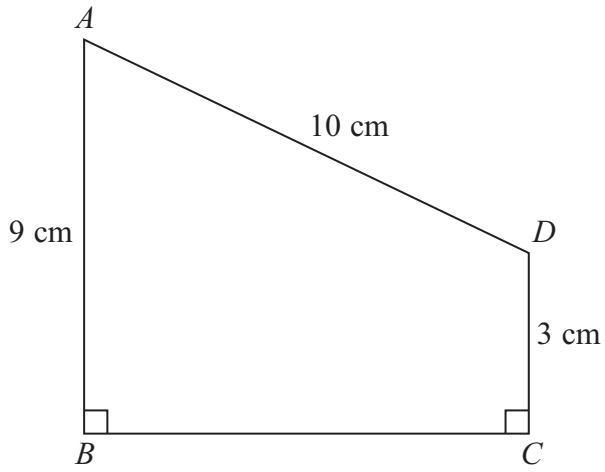
.....

(3)

(Total for Question 10 is 6 marks)

11 *ABCD* is a trapezium.

Diagram **NOT** accurately drawn



AD = 10 cm
AB = 9 cm
DC = 3 cm
Angle *ABC* = angle *BCD* = 90°

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

..... cm

(Total for Question 11 is 5 marks)

12 Bill's weight decreases from 64.8 kg to 59.3 kg.

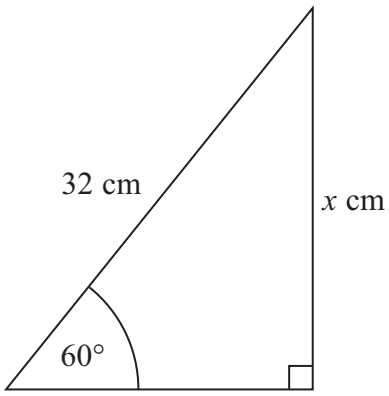
Calculate the percentage decrease in Bill's weight.
Give your answer correct to 3 significant figures.

.....%

(Total for Question 12 is 3 marks)

13

Diagram **NOT** accurately drawn



Calculate the value of x.
Give your answer correct to 3 significant figures.

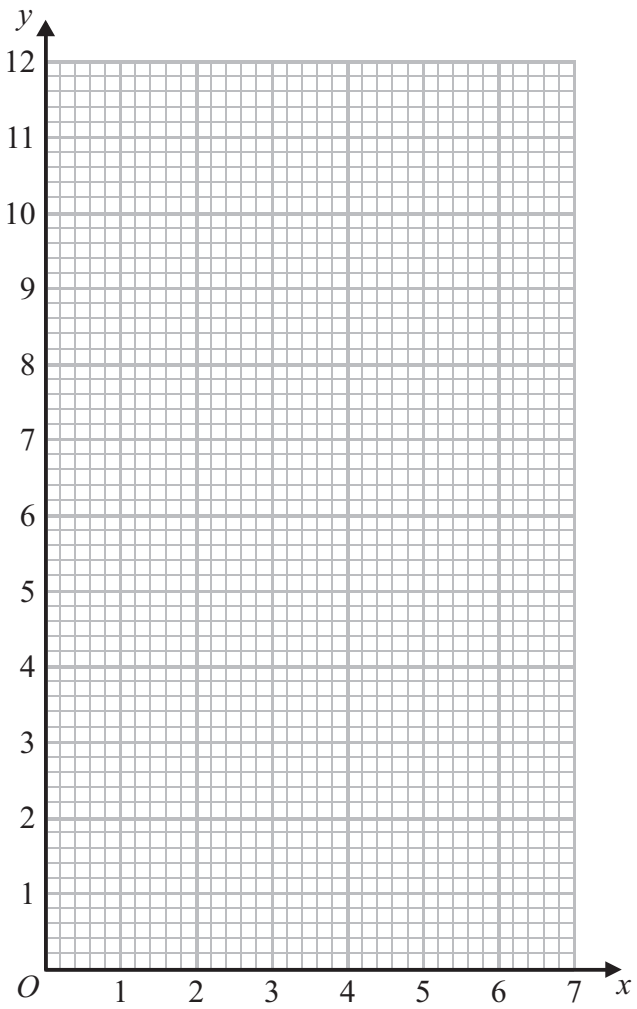
.....

(Total for Question 13 is 3 marks)

14 (a) Complete the table of values for $y = \frac{6}{x}$

x	0.5	1	2	3	4	5	6
y		6	3		1.5		1

(2)



(b) On the grid, draw the graph of $y = \frac{6}{x}$ for $0.5 \leqslant x \leqslant 6$

(2)

(Total for Question 14 is 4 marks)

15 (a) Solve $2x^2 + 9x - 7 = 0$

Give your solutions correct to 3 significant figures.

.....

(3)

(b) Solve $\frac{2}{y^2} + \frac{9}{y} - 7 = 0$

Give your solutions correct to 3 significant figures.

.....

(2)

(Total for Question 15 is 5 marks)