

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16 – 17	
18 – 19	
20 – 21	
<b>TOTAL</b>	



General Certificate of Secondary Education  
Higher Tier

# Mathematics (Linear) B

# 4365/2H

**Paper 2 Calculator**

**Practice Paper 2012 Specification (Set 1)**

# H

<p><b>For this paper you must have:</b></p> <ul style="list-style-type: none"> <li>a calculator</li> <li>mathematical instruments.</li> </ul>	
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### Time allowed

- 2 hours

### Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- If your calculator does not have a  $\pi$  button, take the value of  $\pi$  to be 3.14 unless another value is given in the question.

### Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 105.
- The quality of your written communication is specifically assessed in questions 4, 6, 7 and 24.  
These questions are indicated with an asterisk (\*).
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer booklet.
- Use a calculator where appropriate.

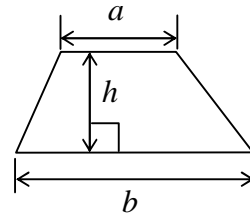
### Advice

- In all calculations, show clearly how you work out your answer.

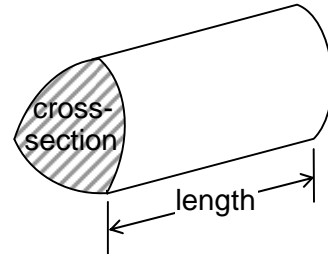
# 4365/2H

## Formulae Sheet: Higher Tier

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

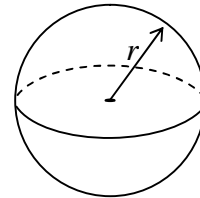


**Volume of prism** = area of cross-section  $\times$  length



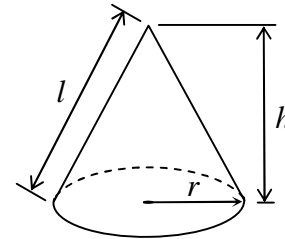
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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



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

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

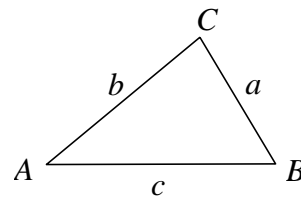


**In any triangle ABC**

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

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

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



### The Quadratic Equation

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

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



Answer **all** questions in the spaces provided

- 1** A bank has these exchange rates for buying and selling Euros.

Buying Euros	£1 = 1.15 Euros
Selling Euros	£1 = 1.29 Euros

Ben buys Euros for £600.  
He spends 570 Euros on his holiday.

He sells the remaining Euros back to the bank.

How much does he get back from the bank?

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Answer £ ..... (5 marks)

- 2 (a)** Factorise  $8w - 10$

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Answer ..... (1 mark)

- 2 (b)** Solve  $7x + 2 = 6 - 3x$

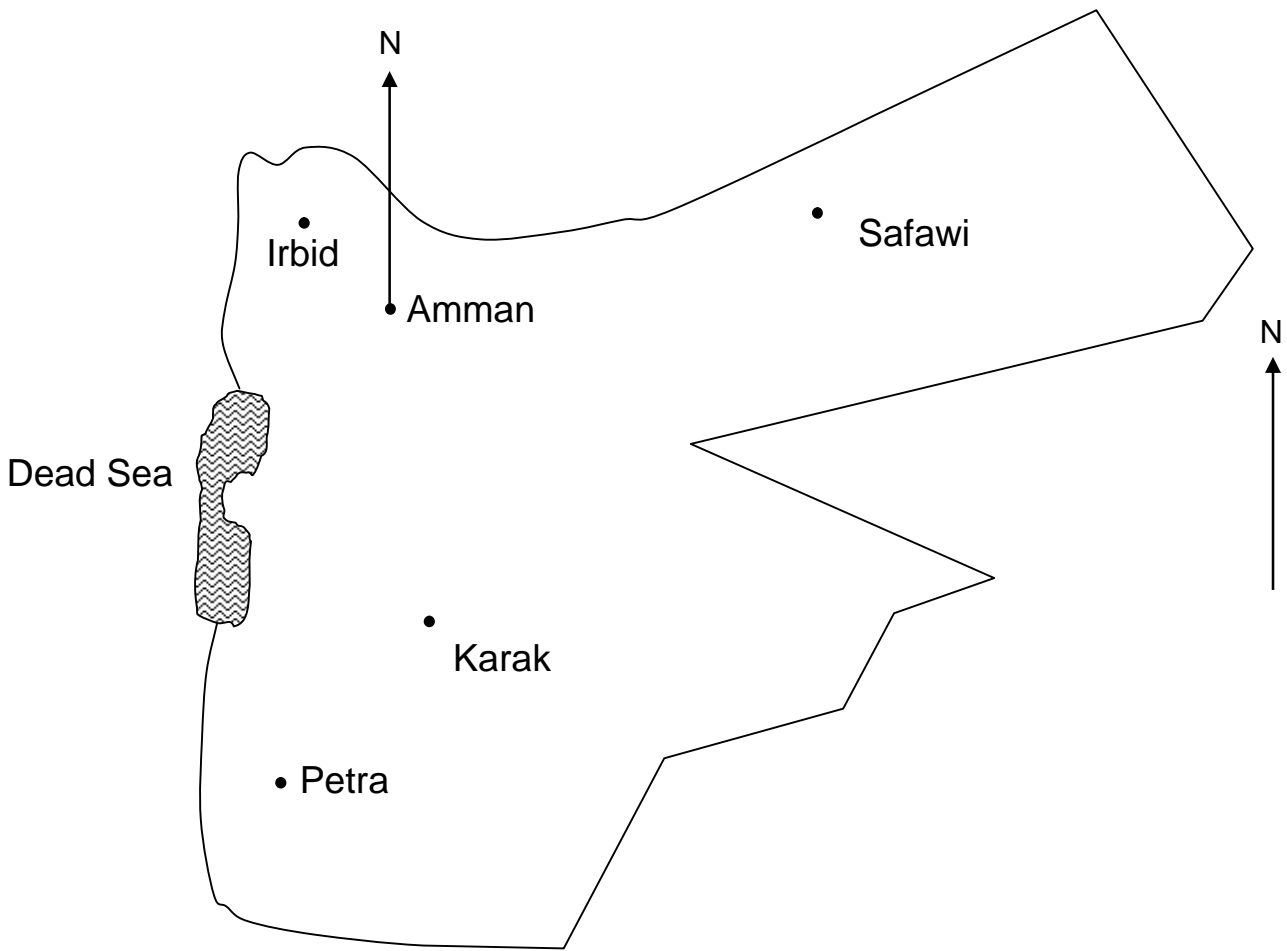
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Answer  $x =$  ..... (3 marks)

3 Here is a map of Jordan.



3 (a) Ezraq is on a bearing of  $110^\circ$  from Amman.  
 Ezraq also lies on the straight road between Karak and Safawi.  
 Mark the position of Ezraq on the map.

(2 marks)

3 (b) The distance from Amman to Irbid is 70 km.  
 Calculate the distance from Amman to Petra.

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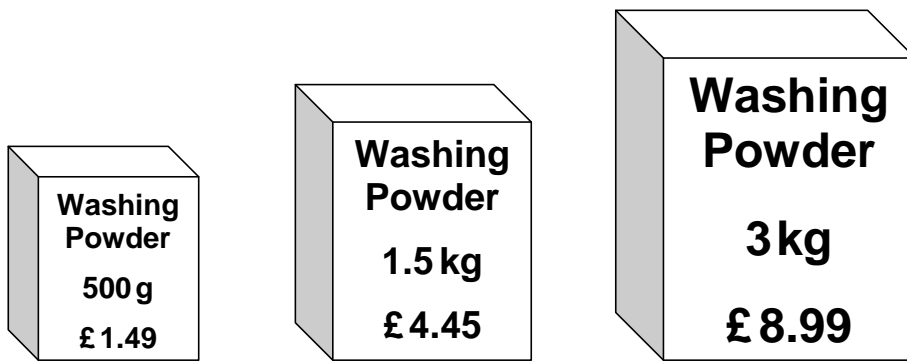
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Answer ..... km (3 marks)

\*4 A shop sells washing powder in three different sizes.



Amanda wants to buy 6 kg of washing powder in the cheapest possible way.

What should she buy?

You **must** show your working.

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(4 marks)

Turn over for the next question

5 Fifty people are asked how many holidays they took last year.

<b>Number of holidays</b>	0	1	2	3
<b>Number of people</b>	22	18	8	2

Work out the mean number of holidays per person.

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Answer ..... (3 marks)

\*6 In 2009, Jeff ran the London Marathon for charity and raised £825

In 2010, the amount he raised was 18% more than the total raised in 2009.  
His target was to raise £1000

Did he reach his target?  
You **must** show your working.

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(4 marks)

\*7 In January 2011, Value Added Tax (VAT) increased from 17.5% to 20%. Here is a formula for working out the price after the increase.

$$A = \frac{48}{47} B$$

A is the price after the increase.

B is the price before the increase.

7 (a) The price of an item before the increase was £98.70

Work out the price after the increase.

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Answer £ ..... (1 mark)

7 (b) The table shows the prices of some clothes in a shop.

	Shirt	Trousers	Dress	Jumper
<b>Price before VAT increase</b>	£ 23.50	£ 39.95	£ 95	£ 35.25
<b>Shop price</b>	£ 24	£ 40.99	£ 97.50	£ 36

The shop price of some clothes is higher than the price should be after the VAT increase.

Which clothes are these?

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Answer ..... (2 marks)

7 (c) For the VAT increase from 17.5% to 20%, show how the formula

$A = \frac{48}{47} B$  was formed.

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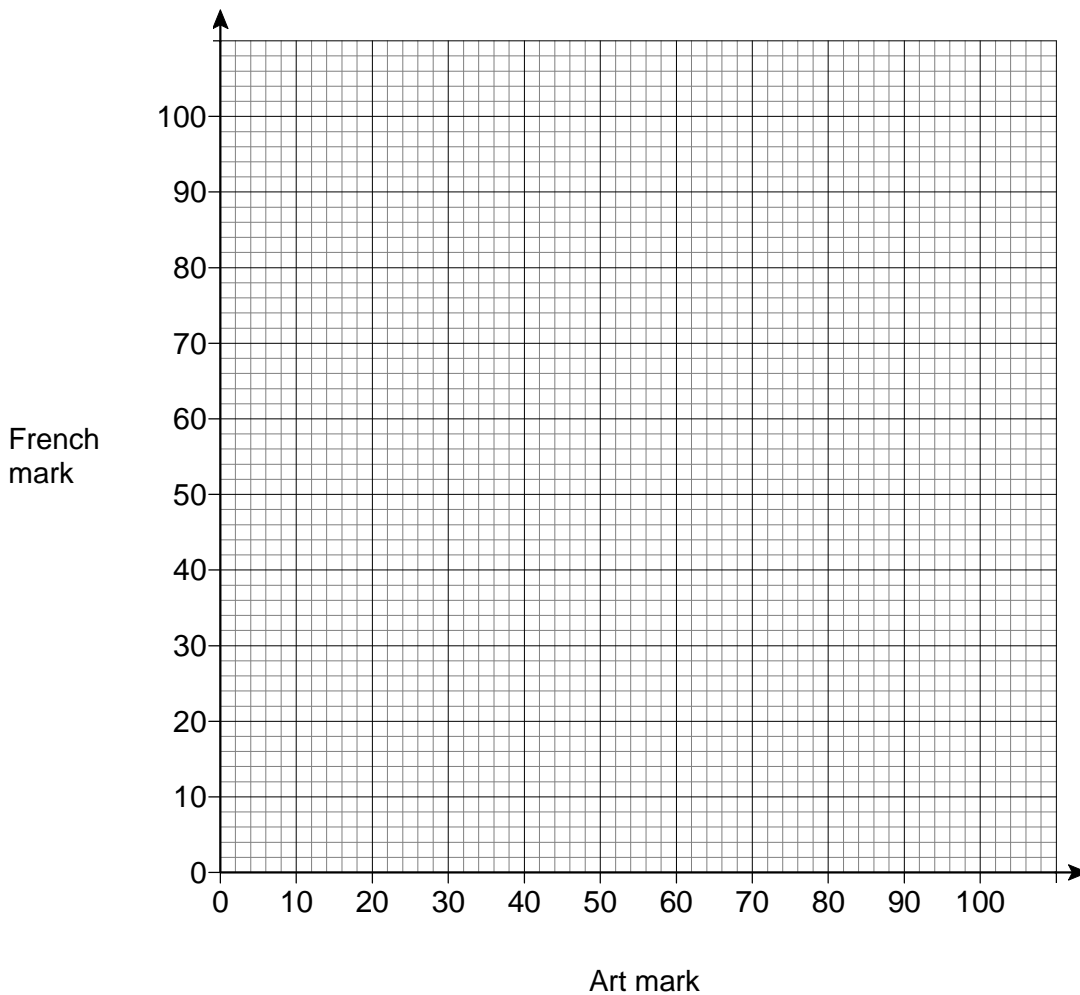
(2 marks)



- 8 The table shows the marks for 10 students in Art and French examinations.

Student	A	B	C	D	E	F	G	H	I	J
Art mark	32	41	62	84	90	20	30	45	20	30
French mark	84	75	30	60	20	60	50	35	40	20

- 8 (a) Show this information on a suitable diagram on the grid below.



(3 marks)

- 8 (b) Describe the correlation between the marks in Art and French.

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(1 mark)

**8 (c)** One of these students is chosen at random.

Work out the probability that this student has a mark of over 50 in at least one of the examinations.

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Answer ..... (2 marks)

**9 (a)** Simplify  $x^2 \times x^5$

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Answer ..... (1 mark)

**9 (b)** Simplify  $w^{10} \div w^5$

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Answer ..... (1 mark)

**9 (c)** Expand and simplify  $2(y + 3) + 3(2y - 1)$

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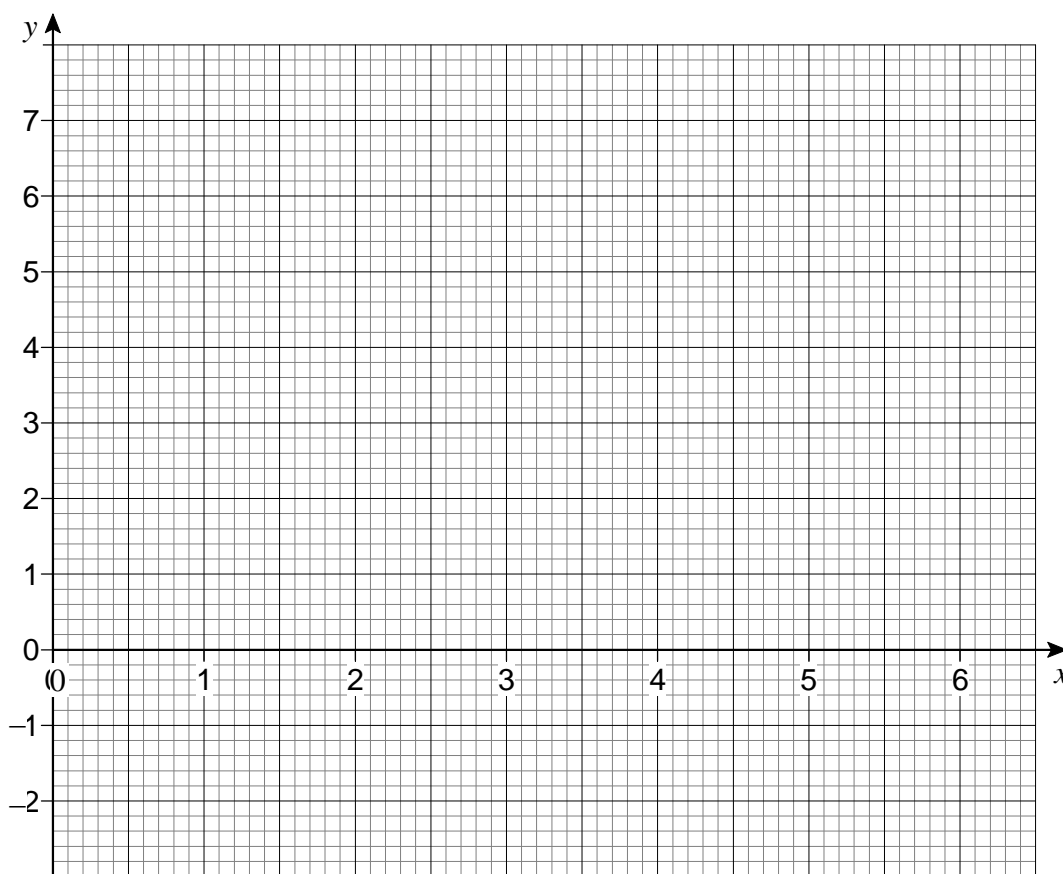
Answer ..... (2 marks)

10 (a) Complete the table of values for  $y = x^2 - 6x + 7$

$x$	0	1	2	3	4	5	6
$y$	7		-1	-2		2	7

(2 marks)

10 (b) Complete the graph of  $y = x^2 - 6x + 7$  for values of  $x$  from 0 to 6



(3 marks)

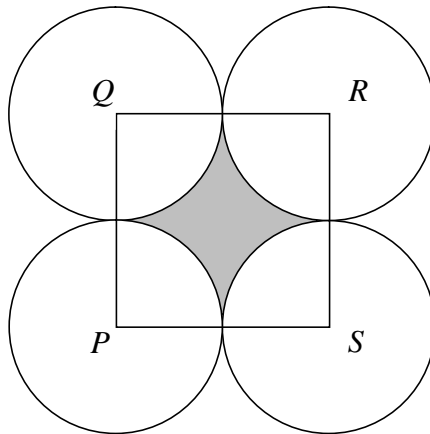
10 (c) Does the graph pass through the point (10, 51)?  
Show how you decide.

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(1 mark)

- 11 The diagram shows four identical touching circles with centres  $P$ ,  $Q$ ,  $R$  and  $S$ .  
The radius of each circle is 5 cm.



Not drawn accurately

Calculate the shaded area.

Give your answer to two significant figures.

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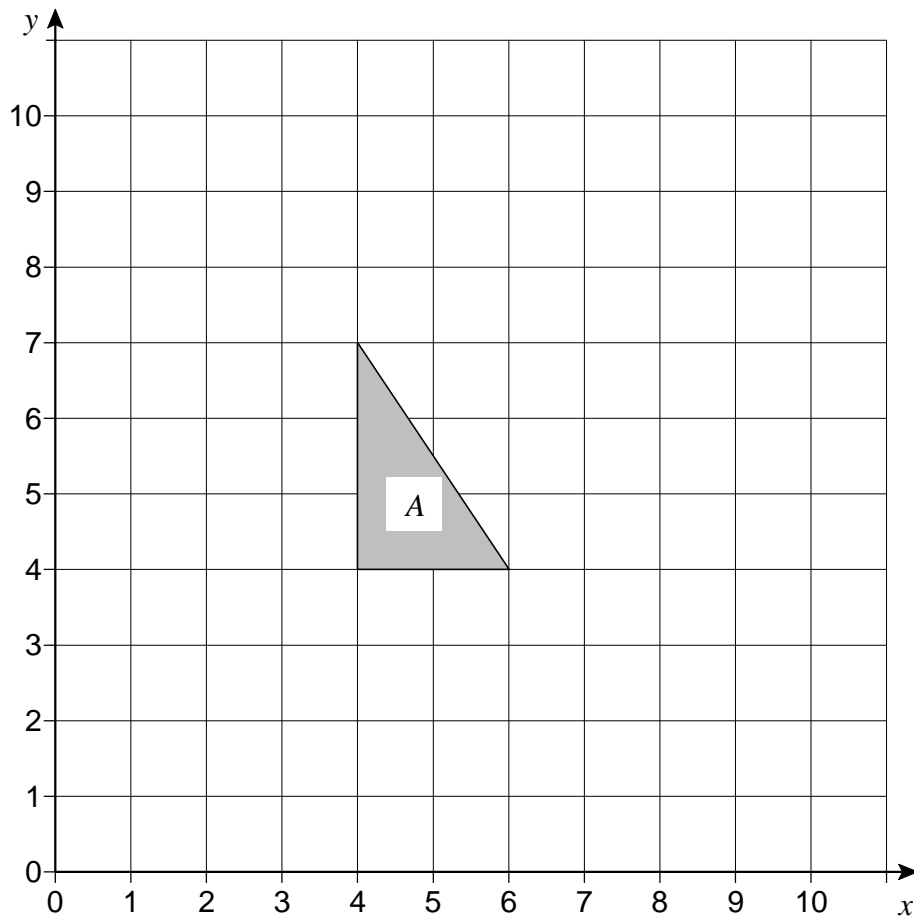
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Answer .....cm<sup>2</sup> (5 marks)

**Turn over for the next question**

- 12 Triangle  $A$  is shown on the grid.



Translate triangle  $A$  by the vector  $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$

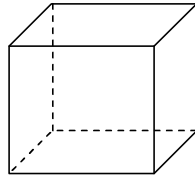
(2 marks)

13 (a) Solve  $6x^2 = 1734$  where  $x$  is positive.

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Answer  $x =$  ..... (2 marks)

13 (b) The diagram shows a cube.

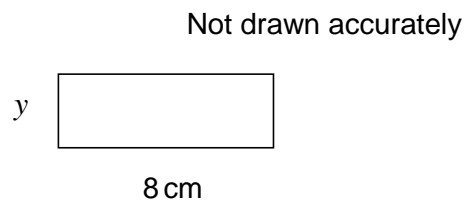
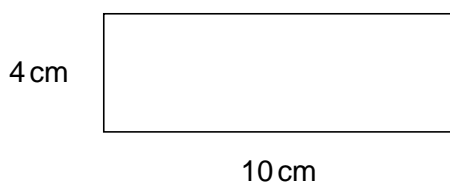


The total surface area of the cube is  $1734 \text{ cm}^2$ .  
 Work out the volume of the cube.

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Answer ..... $\text{cm}^3$  (2 marks)

14 The diagram shows two similar rectangles.



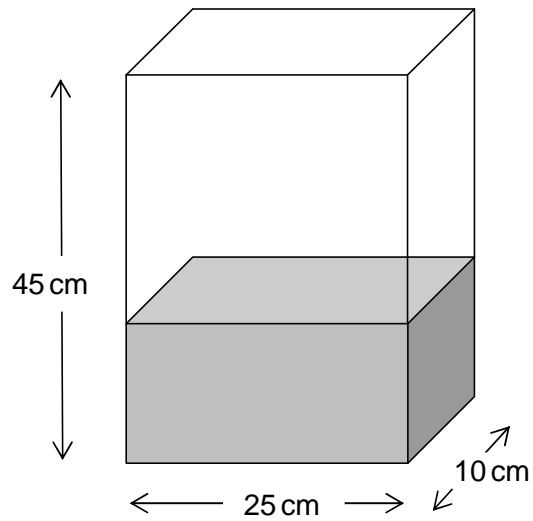
Work out the value of  $y$ .

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Answer ..... cm (3 marks)

15

The diagram shows a tank containing water.  
The tank is one-third full.  
The tank measures 25 cm by 10 cm by 45 cm.



The tank is now filled at the rate of  $250 \text{ cm}^3$  per minute.

How long will it take to fill the rest of the tank?

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Answer ..... minutes (4 marks)

**16 (a)** Factorise  $(c + 3)^2 - 2(c + 3)$

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Answer ..... (2 marks)

**16 (b)** Make  $x$  the subject of  $4(x + y) = 7y - 5$

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Answer ..... (3 marks)

**16 (c)** Given that  $0 < x < 1$  tick the correct box for each statement.

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**Always true**

**Sometimes true**

**Never true**

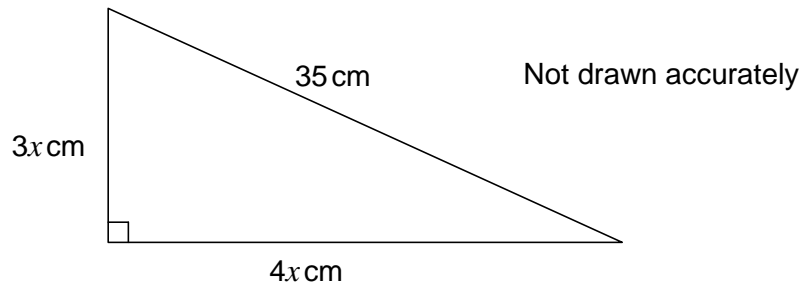
$x^2 > x$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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$\frac{1}{x} > 2$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(2 marks)



- 17 The diagram shows a right-angled triangle.



Show that the perimeter of the triangle is 84 cm.

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(4 marks)

- 18 The mass of the Sun is  $1.99 \times 10^{30}$  kg.

The mass of the Earth is  $5.98 \times 10^{24}$  kg.

How many times heavier is the Sun than the Earth?

Give your answer to an appropriate degree of accuracy.

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Answer ..... (3 marks)

19

Solve  $5x^2 - 6x - 2 = 0$

Give your answers to two decimal places.

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Answer ..... (3 marks)

20

Simon runs 800 metres in 1 minute 52 seconds.

The distance is correct to the nearest 10 metres.

The time is correct to the nearest second.

Calculate Simon's maximum possible speed.

State the units of your answer.

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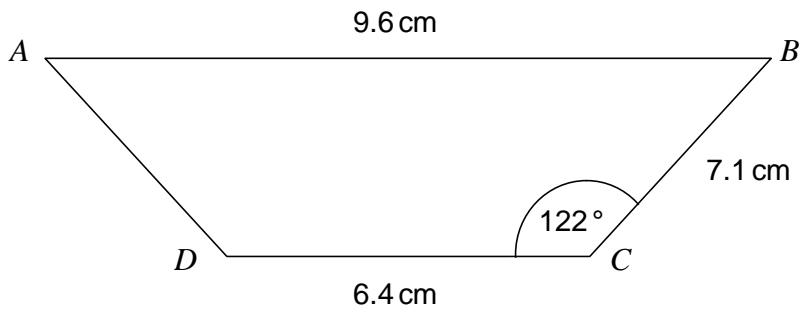
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Answer ..... (5 marks)

21

The diagram shows a trapezium  $ABCD$ .Not drawn  
accurately

Work out the area of the trapezium.

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Answer .....  $\text{cm}^2$  (5 marks)

**22**

In a bag there are 45 counters.

28 of the counters are white.

Two counters are chosen at random without replacement.

What is the probability that both are white?

Give your answer as a fraction in its simplest form.

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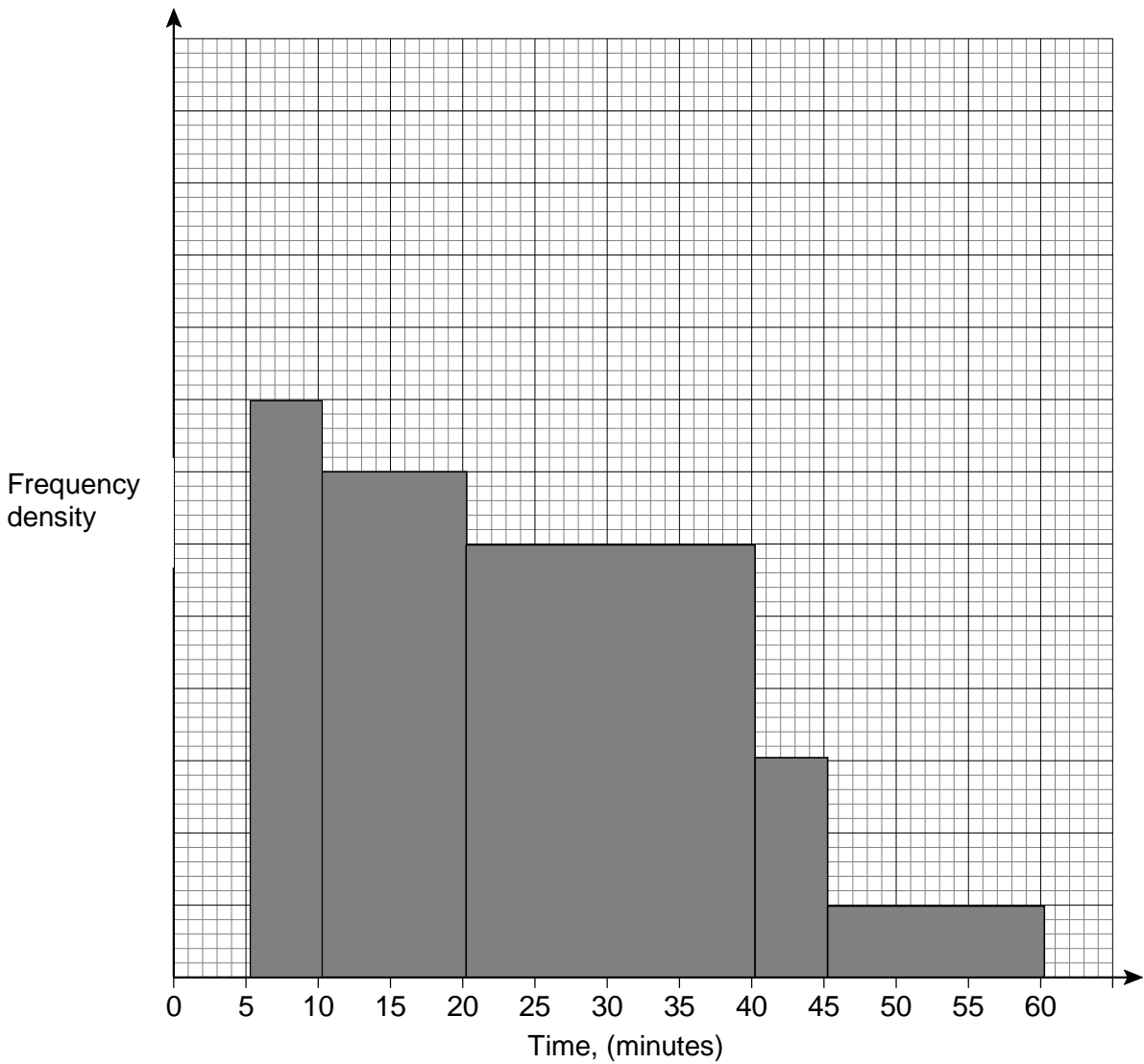
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Answer ..... (3 marks)

**Turn over for the next question**

23 The times that some teachers take travelling to school are shown in the histogram.



42 teachers take between 10 minutes and 20 minutes travelling to work.

What is the probability that a teacher chosen at random takes more than 30 minutes?

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Answer ..... (5 marks)

- \*24 A bag contains only red, blue and white counters.  
A counter is chosen at random.

The probability it is a blue counter is  $\frac{4}{x}$

The probability it is a white counter is  $\frac{7}{x-3}$

The probability it is a red counter is  $\frac{1}{2}$

Work out the value of  $x$ .

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Answer ..... (6 marks)

**END OF QUESTIONS**

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