Surname	Centre Number	Candidate Number
Other Names		0

GCSE

4370/06

A15-4370-06

MATHEMATICS – LINEAR
PAPER 2
HIGHER TIER

A.M. TUESDAY, 10 November 2015

2 hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**5**	
2.	**4**	
3.	**4**	
4.	**4**	
5.	**7**	
6.	**7**	
7.	**6**	
8.	**10**	
9.	**6**	
10.	**6**	
11.	**8**	
12.	**6**	
13.	**6**	
14.	**5**	
15.	**3**	
16.	**3**	
17.	**10**	
Total	**100**	

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ADDITIONAL MATERIALS

A calculator will be required for this paper.

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

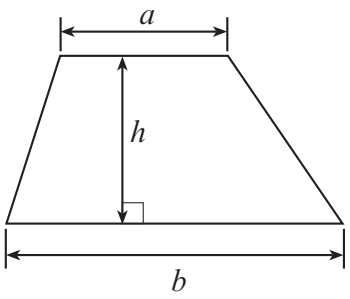
Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

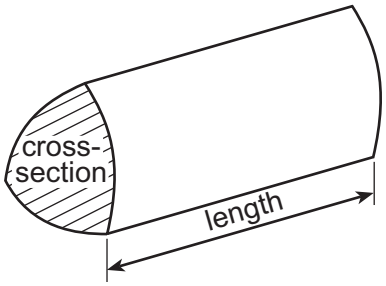
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **8***(a)*.

Formula List

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

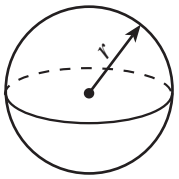


Volume of prism = area of cross-section × length



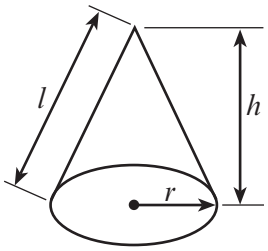
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

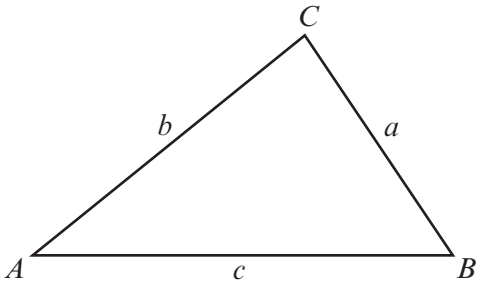


In any triangle ABC

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



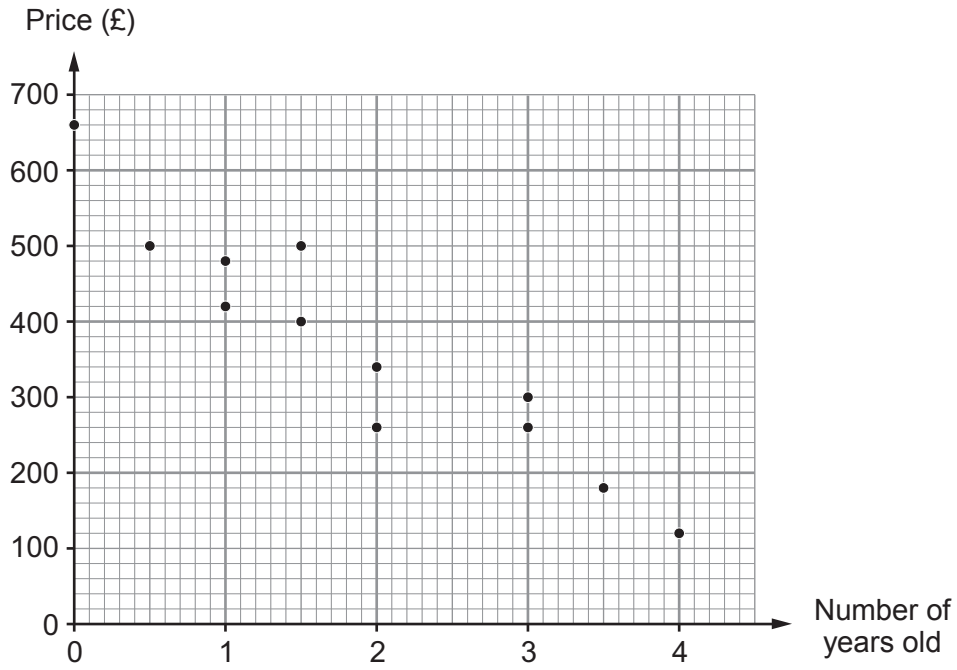
The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by $x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

Examiner only

1. The scatter diagram shows the price and age for each of 12 scooters of the same make and model.



(a) Write down the price of the new scooter. [1]

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(b) Write down the price of the oldest scooter. [1]

.....

(c) Draw, by eye, a line of best fit on the scatter diagram. [1]

(d) Write down the type of correlation shown by the scatter diagram. [1]

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(e) Estimate the price of a $2\frac{1}{2}$ year old scooter of the same make and model. [1]

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Turn over.

Examiner only

2.

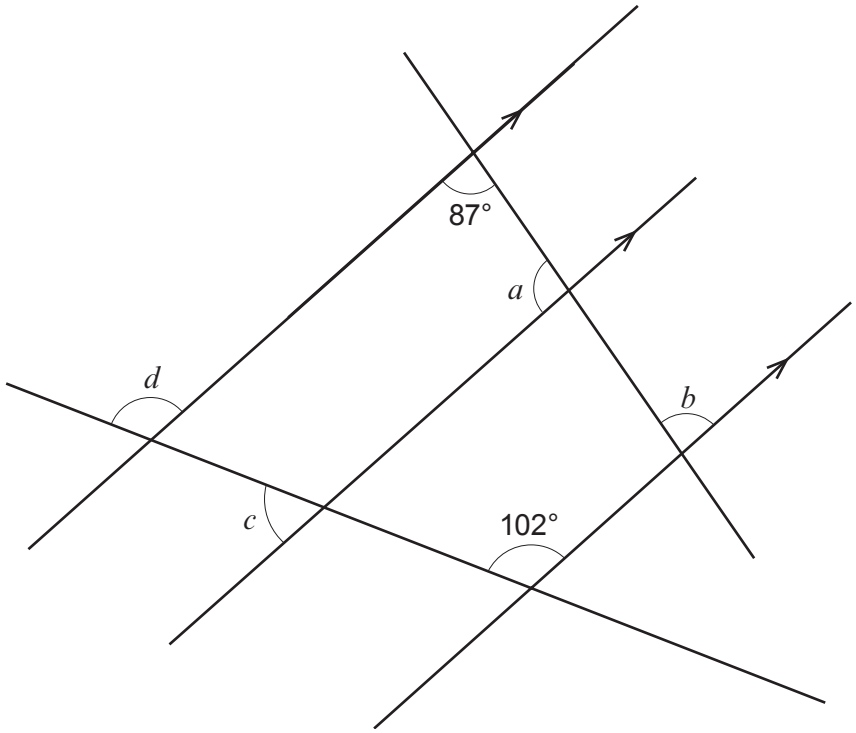

Diagram not drawn to scale

Find the sizes of the angles a, b, c and d. [4]

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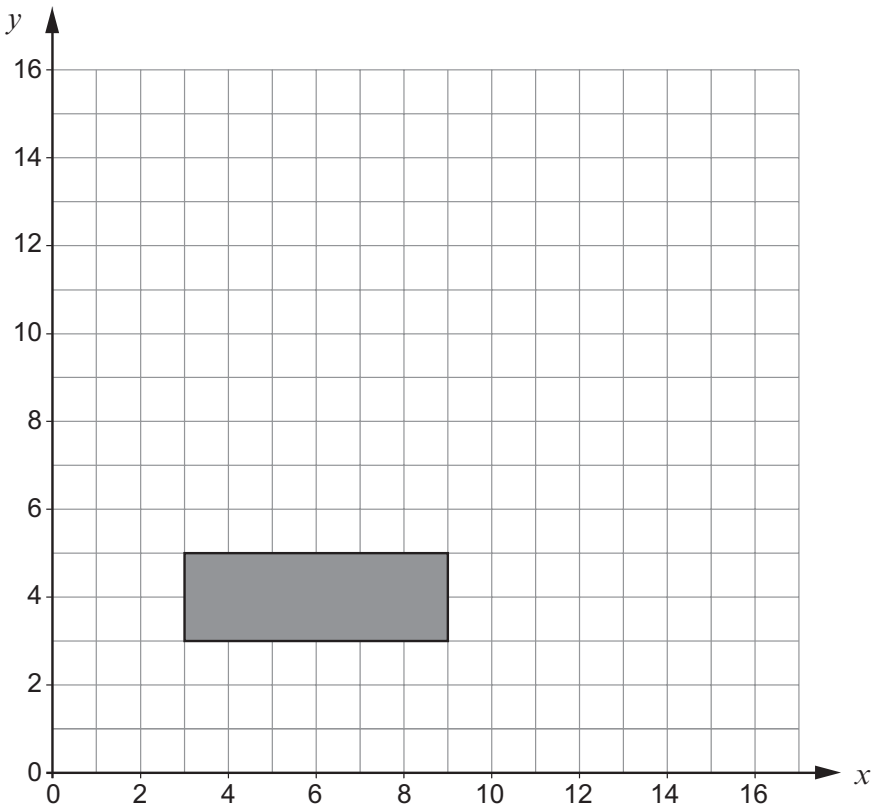
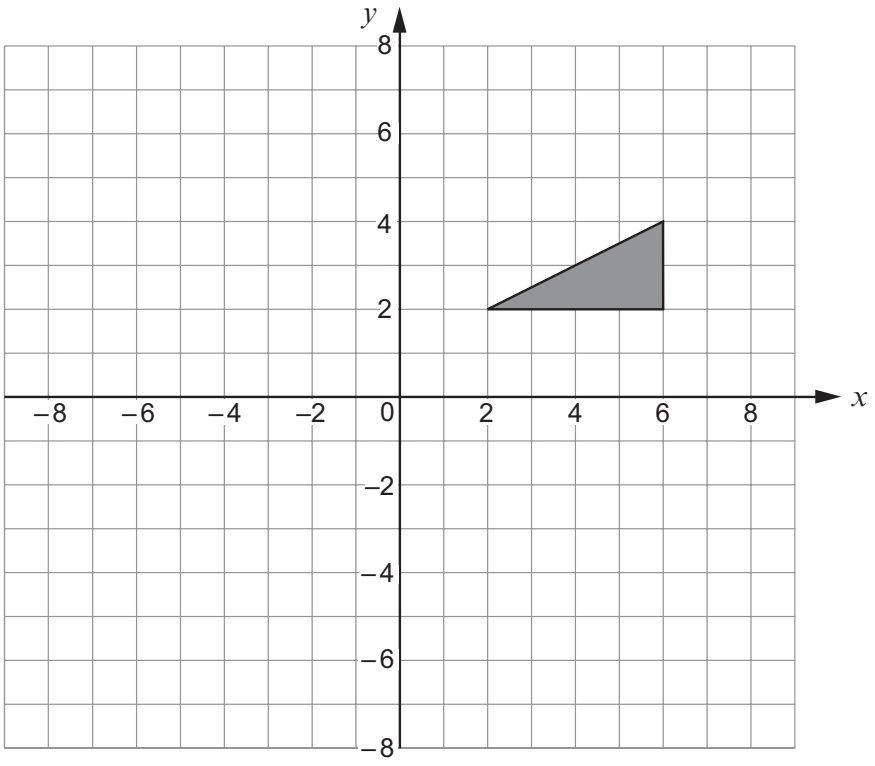
a = ... ° b = ... ° c = ... ° d = ... °

Examiner only

3. *(a)* Enlarge the rectangle shown by a scale factor of 2, using (2, 1) as the centre of the enlargement. [2]



(b) Rotate the triangle shown below through 180° about the point (1, 2). [2]



Examiner only

4. *(a)* Does the point (4, –2) lie on the straight line $2x - 3y = 14$?
Put a tick (✓) in the appropriate box.
You **must** show working to justify your answer. [1]

Yes ☐ No ☐

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(b) Does the point (4, 4) lie on the curve $2y = x^2$?
Put a tick (✓) in the appropriate box.
You **must** show working to justify your answer. [1]

Yes ☐ No ☐

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(c) Write down the coordinates of any **two** points that lie on the straight line $x + y = -4$. [2]

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.....

(.....) and (.....)

Examiner only

5.

Buy your holiday money here	
£1 buys	192.45 Icelandic krona
	100.32 Indian rupees
	53.67 Russian rubles

Use the exchange rates in the table to answer the following questions.

(a) Exchange £350 into Icelandic krona. [2]

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..... Icelandic krona

(b) How much money, in £, would be needed to buy 2608.32 Indian rupees? [2]

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£ .....

(c) Complete the sentence below. [3]

'100 Russian rubles are worth the same amount as ..... Icelandic krona.'

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Turn over.

Examiner only

6. *(a)* In the mountains of Aplengrub, the snowfall on each of 28 days was measured. The results are summarised in the table below.

Daily snowfall, s (cm)	Number of days
$5 \leqslant s < 15$	5
$15 \leqslant s < 25$	10
$25 \leqslant s < 35$	12
$35 \leqslant s < 45$	1

(i) Calculate an estimate for the mean daily snowfall for the 28 days. [4]

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(ii) State the modal class. [1]

Modal class .....

(iii) Write down the class in which the median lies. [1]

Median class .....

(b) In the mountains of Terragal, the data collected on snowfall, over the same 28 days, was as follows.

Terragal 

Mean daily snowfall 20 cm
Median daily snowfall 9 cm

Ralph was on holiday in Terragal for these 28 days.
He does not understand how the mean snowfall could be as high as 20 cm.
Ralph says,
'*On about half of the days there was less than 10 cm of snowfall each day.*'
Write a brief explanation to help Ralph understand how it is possible to have a mean of 20 cm with a median of 9 cm. [1]

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Examiner only

7. *(a)* Factorise $8x^2 - 16x$. [2]

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(b) Expand $5y(2y^2 - 3)$. [2]

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(c) Simplify $4h^3 \times 5h^2$. [1]

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(d) Simplify $\frac{76f^{10}}{38f^5}$. [1]

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Examiner only

8.

Rowena owns a car that Dafydd is planning to buy in 3 years' time.

Rowena's car is currently worth £3500.
Rowena estimates that her car will repeatedly depreciate by 24% of its value each year.

Dafydd has already saved £100.
Dafydd wants to set up a savings account to save a fixed amount of money each month to buy Rowena's car in 3 years' time.

(a) You will be assessed on the quality of your written communication in this part of the question.

What would be the minimum amount of money, to the nearest pound, that Dafydd should pay into his savings account each month?
You must show all your working. [9]

Examiner only

(b) Do you think that this amount saved each month will guarantee that Dafydd will have enough money to buy Rowena's car?
You must give a reason for your answer. [1]

Examiner only

9. Calculate the lengths of the sides x and y in the right-angled triangles shown below.

(a) [3]

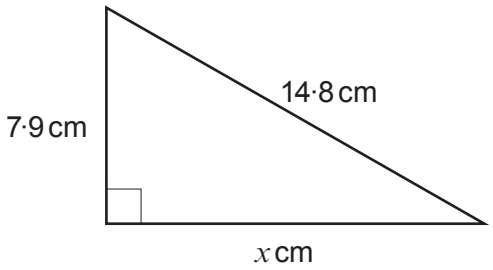

Diagram not drawn to scale

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x = ... cm

(b) [3]

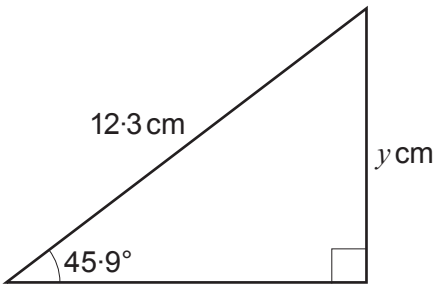

Diagram not drawn to scale

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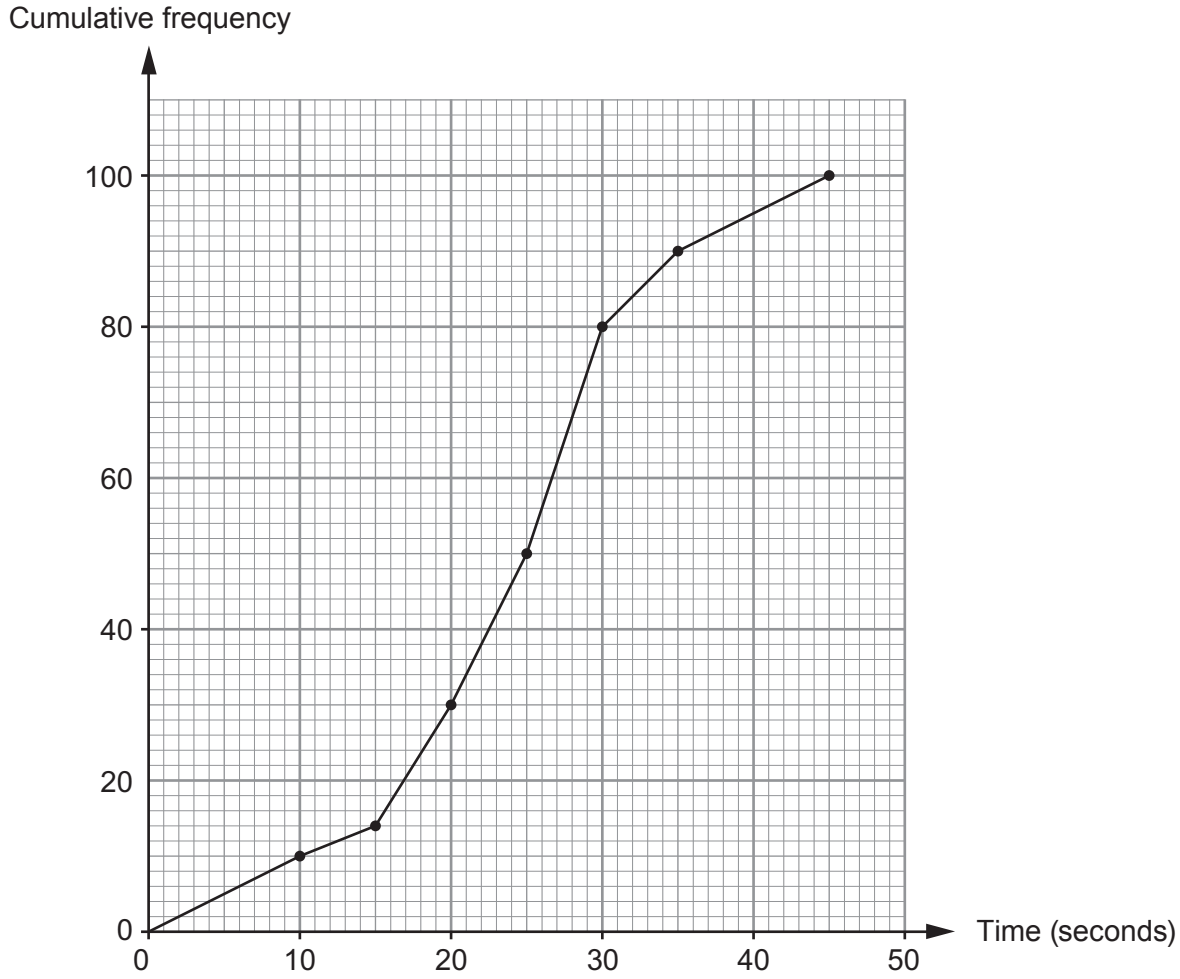
y = ... cm

Examiner only

10. An exercise was carried out to time a group of 100 passengers leaving an aeroplane using the emergency exits.
The results are illustrated in the cumulative frequency diagram shown below.



(a) How many passengers took between 20 seconds and 35 seconds to leave the plane? [2]

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(b) How many passengers took more than 40 seconds to leave the plane? [2]

.....

(c) The regulations state that 85% of the passengers should be able to leave the plane in less than 30 seconds.
Complete the following statement. You must show your working. [2]

'In this exercise, the target time for passengers leaving the plane in an emergency was missed by ..... seconds.'

.....

Examiner only

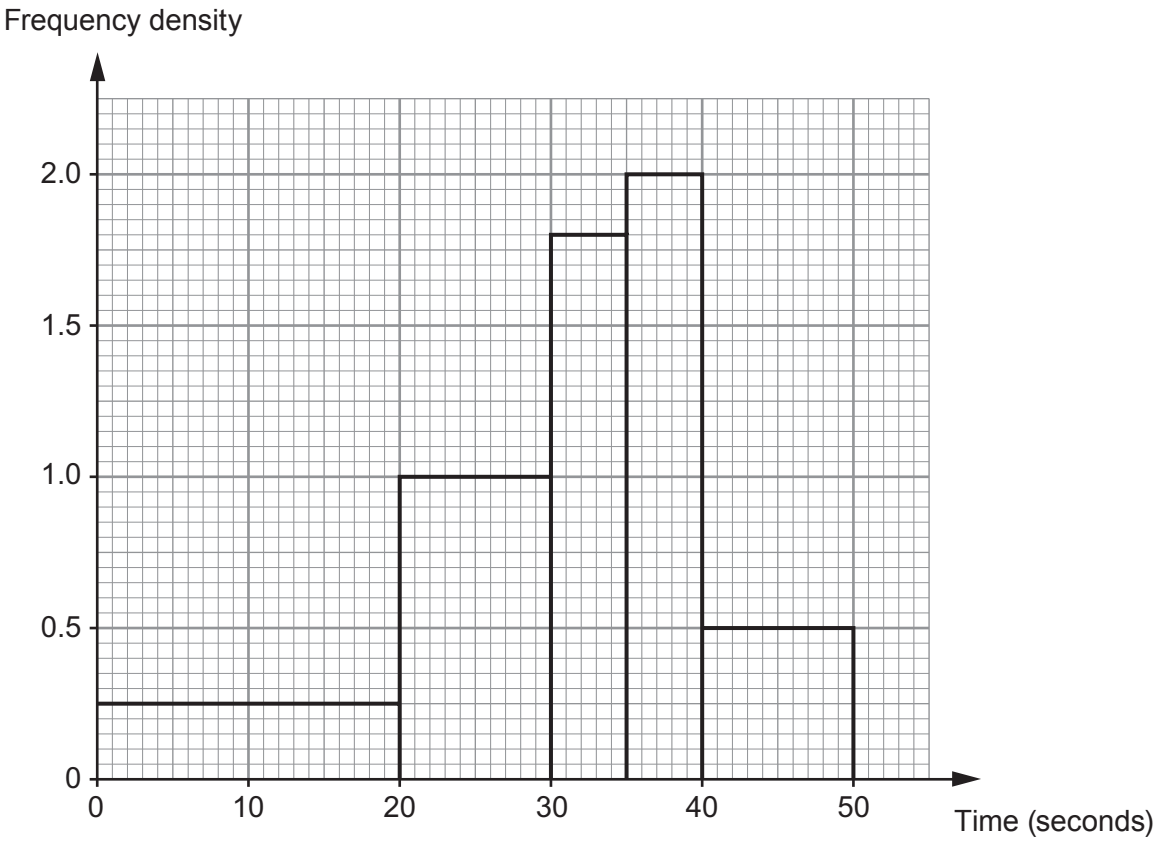
11. *(a)* The surface area of a circular pond is $35\,m^2$.
Calculate the diameter of the pond. [4]

(b) Water flows into the pond at a rate of 50 litres per minute.
Complete the following statement by inserting a value written in standard form, correct to 3 significant figures. [4]

'Water flows into the pond at a rate of ..... m^3 per second.'

Examiner only

12. The histogram shows the times taken by people in a group to get off a train.



(a) Calculate the number of people in the group. [3]

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(b) Calculate an estimate for the number of people who took more than 37 seconds to get off the train. [2]

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(c) In fact, no one got off the train in less than 10 seconds.
Explain how the histogram should be changed to take this information into account. [1]

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Examiner only

13. *(a)* Factorise $x^2 - 5x - 24$ and hence solve $x^2 - 5x - 24 = 0$. [3]

(b) Solve the following quadratic equation.
Give your answers correct to two decimal places.
You must show all your working. [3]

$$5x^2 + 2x - 9 = 0$$

Examiner only

14. Osian owns 20 ties.
He has 2 plain red ties, 3 plain blue ties and 15 mixed-colour patterned ties.

Osian selects 2 ties at random to take on holiday.

(a) Calculate the probability that the 2 ties Osian takes on holiday are both plain ties. [2]

(b) Calculate the probability that **at most** one of the ties Osian takes is a plain red tie. [3]

Turn over.

Examiner only

15. Two **similar** rugby balls are shown below.

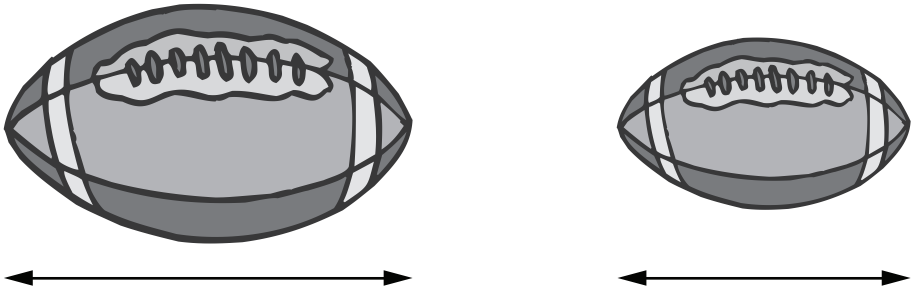

Diagram not drawn to scale

The volume of the larger rugby ball is 500 cm^3.
Calculate the volume of the smaller rugby ball. [3]

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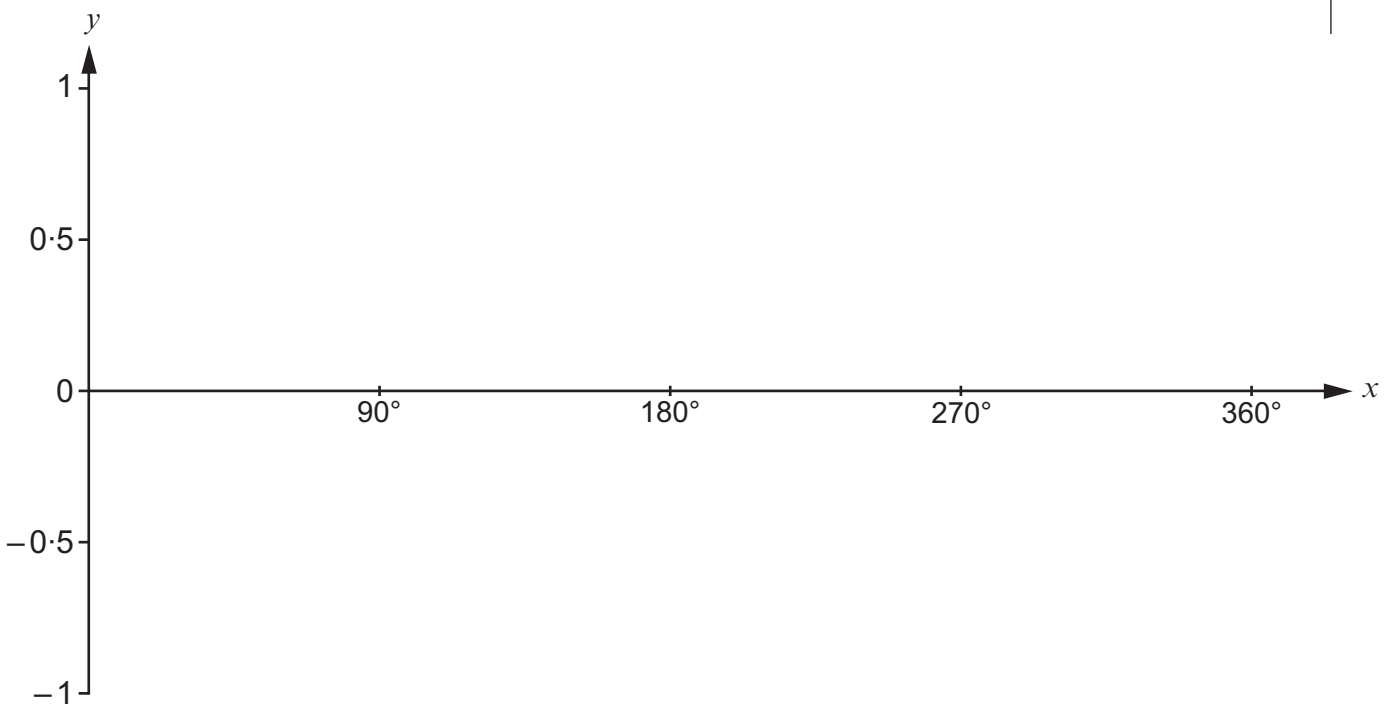
Examiner only

16. *(a)* Use the axes shown below to sketch the graph of $y = \cos x$ between $x = 0°$ and $x = 360°$. [1]



(b) Find all the solutions of the equation $\cos x = -0{\cdot}616$ in the range 0° to 360°.
Give your solutions correct to the nearest degree. [2]

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Turn over.

Examiner only

17. The diagram shows a quadrilateral *ABCD*. Angle $D\hat{A}B$ is acute.

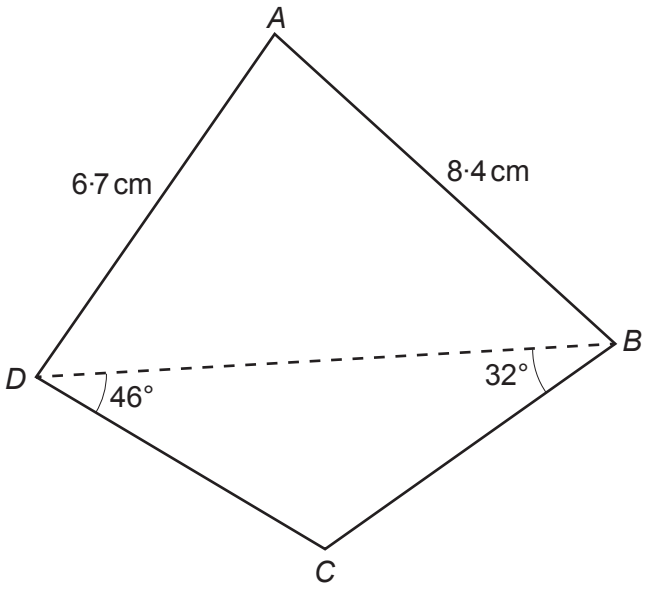

Diagram not drawn to scale

The area of triangle *ABD* is 22·8 cm^2.
Calculate the perimeter of the quadrilateral *ABCD*. [10]

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