

Candidate Name	Centre Number	Candidate Number
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**New GCSE**

4351/02

**MATHEMATICS (UNITISED SCHEME)  
UNIT 1: MATHEMATICS IN EVERYDAY LIFE  
HIGHER TIER**

P.M. MONDAY, 13 June 2011

1  $\frac{1}{4}$  hours

**ADDITIONAL MATERIALS**

A calculator will be required for this paper.

**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  $\pi$  as 3.14 or use the  $\pi$  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.

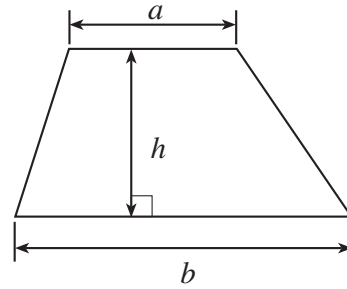
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **11(b)(ii)**.

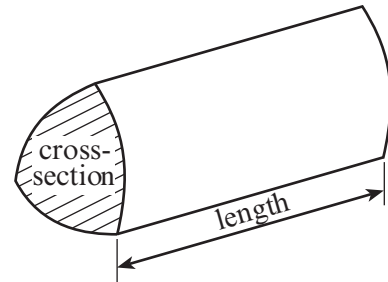
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	4	
2	7	
3	3	
4	3	
5	4	
6	2	
7	4	
8	5	
9	3	
10	3	
11	13	
12	4	
13	10	
<b>TOTAL MARK</b>		

## Formula List

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

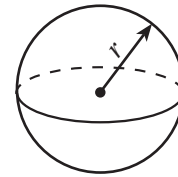


$$\text{Volume of prism} = \text{area of cross-section} \times \text{length}$$



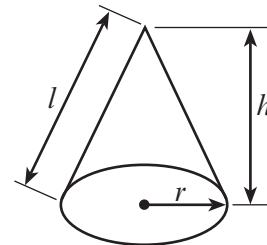
$$\text{Volume of sphere} = \frac{4}{3} \pi r^3$$

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



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

$$\text{Curved surface area of cone} = \pi r l$$

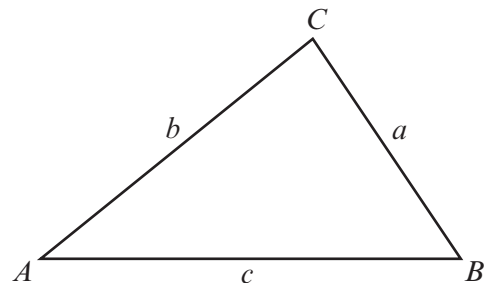


In any triangle  $ABC$

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

$$\text{Cosine rule } a^2 = b^2 + c^2 - 2bc \cos A$$

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



### The Quadratic Equation

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

where  $a \neq 0$  are given by

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

- 1. A survey was carried out. One of the purposes of the survey was to obtain data on how often people aged 60 and over bought pizza. Only the following two questions were asked.

Q1. *What is your name and your address?*

Q2. *How often do you buy pizzas?*

<i>Never</i>	<i>1 - 3 times</i>	<i>4 - 6 times</i>	<i>6 or more times</i>
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- (a) For **each** question give **one** reason why it is not suitable.

Q1. ....

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Q2. ....

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[2]

- (b) Write down a **different** question which would be necessary and appropriate for this survey.

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[1]

- (c) The survey was carried out by questioning people leaving a pizza restaurant on a Saturday night. Give **one** criticism on how the survey was carried out.

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[1]

2. Gareth has 10 wooden fence panels that need painting on **both sides**.  
Each fence panel is 2 m long and 1.5 m high.

The paint he wants to use is only sold in cans that contain enough paint to cover an area of  $25\text{m}^2$ .

Each can costs £12.99.

- (a) How much will Gareth have to pay in order to have enough paint?

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- (b) How many more complete fence panels could he have painted with the paint he has left over?

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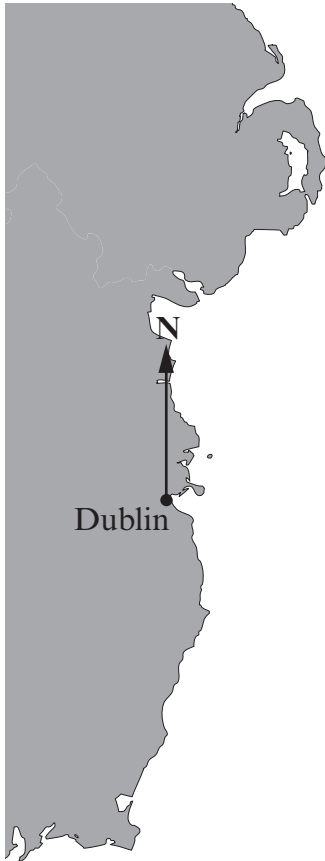
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[2]

3. A ship,  $S$ , is on a bearing of  $075^\circ$  from Dublin and on a bearing of  $330^\circ$  from Aberdaron. By drawing suitable lines on the diagram below, mark the position of  $S$ .

[3]



- 4. Farah is 26 years older than her son Amir.  
Their mean age is 30 years.

How old is Farah?

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[3]

- 5. Sian invests £7000 for 3 years at 4% per annum compound interest.  
Find the compound interest earned in the 3 years.

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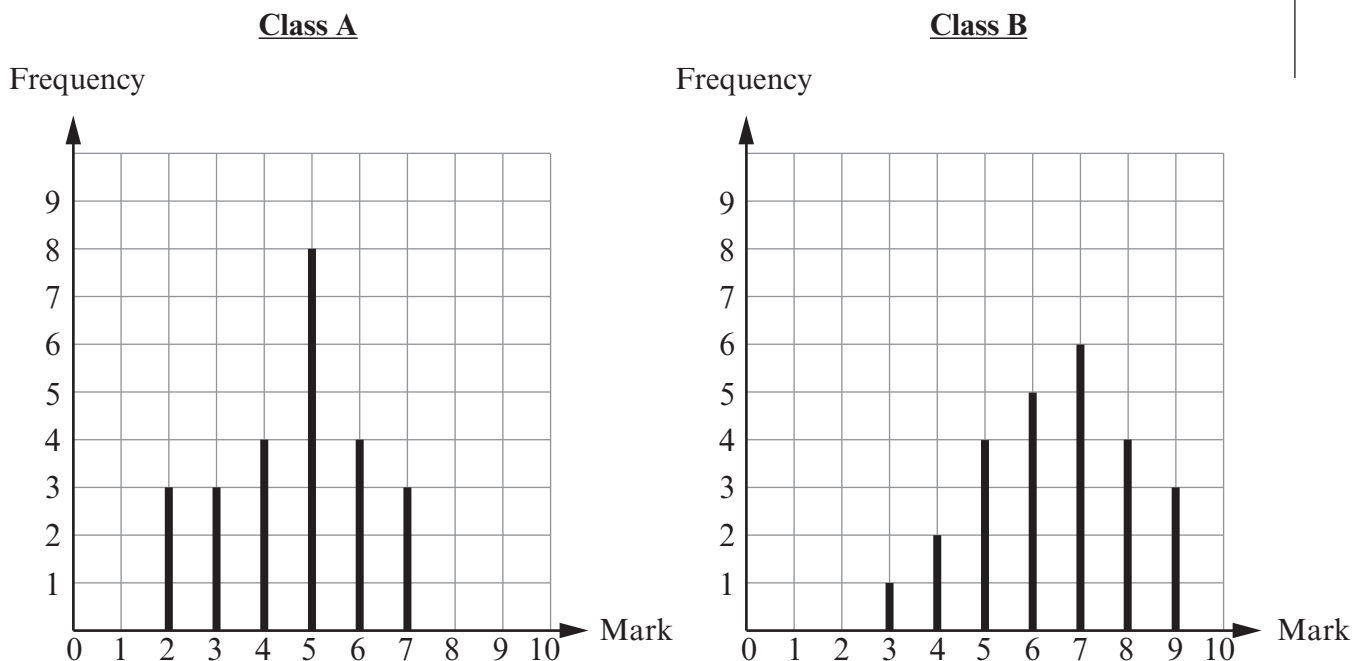
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6. Pupils in Class A and Class B of a school were given a Mathematics test.

The school recorded the marks gained as shown below.



- (a) Which class has the greater range of marks? You must give an explanation for your choice.

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[1]

- (b) Without making any calculations, which class has the greater mean mark for the test? You must give an explanation for your choice.

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7. (a) Find the value of  $\sqrt{3 \cdot 27^2 - 2 \cdot 8}$  correct to three significant figures.

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- (b) A family reduced their annual car mileage from 18500 miles to 16280 miles.  
Calculate the percentage reduction.

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8. The formula used for converting temperature measured in degrees Celsius ( $C$ ) to its value in degrees Fahrenheit ( $F$ ) is,

$$F = \frac{9C}{5} + 32 .$$

- (a) What would the temperature be, measured in degrees Celsius, when it is given as  $14^{\circ}\text{F}$ ?

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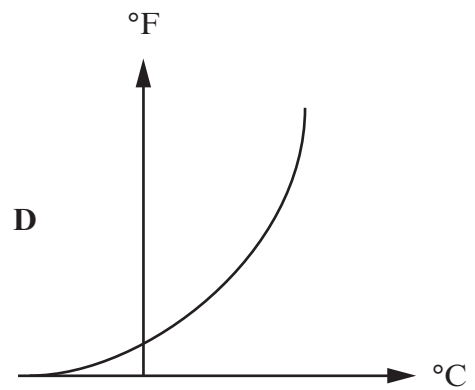
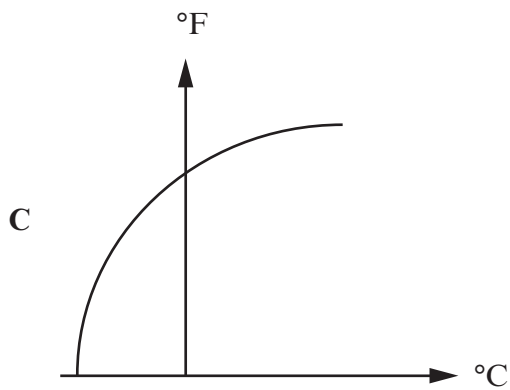
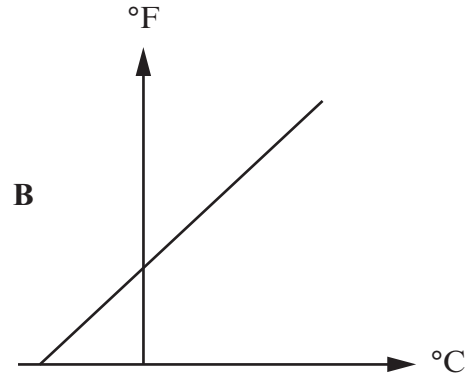
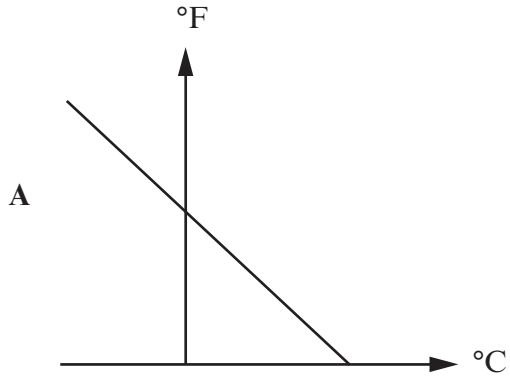
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(b) Which one of the following graphs **A**, **B**, **C** or **D** could represent the conversion between  $^{\circ}\text{C}$  and  $^{\circ}\text{F}$ ? You must give a reason for your choice.



Graph .....

Reason .....

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[2]

9. It took 5 days for 18 workers to prepare 10 acres of land for planting.

Showing all your calculations, how long would it take to prepare another 8 acres of land using 12 workers given that all conditions are similar?

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[3]

10. In a sale the price of a shed is reduced by 30% of its original price.

The sale price of the shed is £182.

Calculate the original price of the shed.

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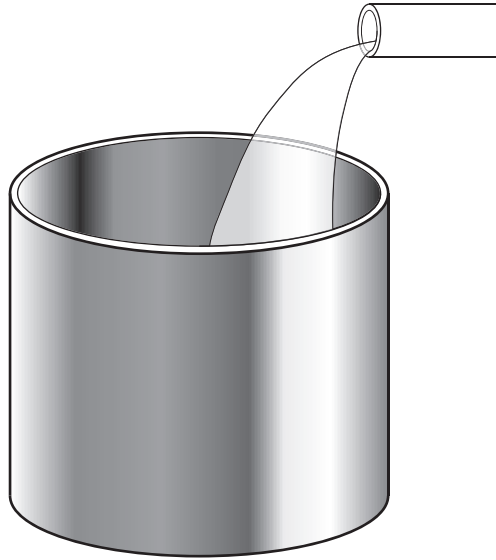
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11. (a) A water tank is cylindrical with a base radius of 45 cm.  
Water is pumped into this tank at a rate of 1 litre per second.  
What is the height of the water in the tank after 3 minutes?



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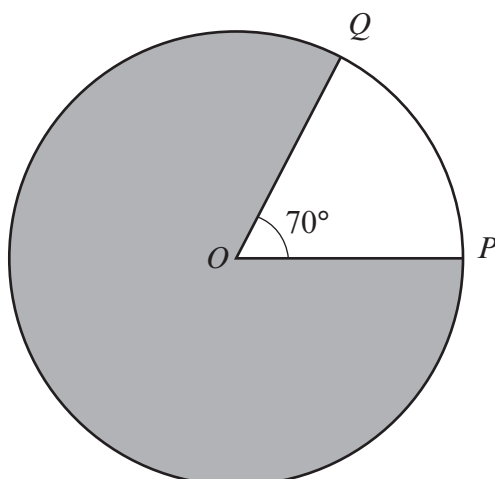
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12.

*Diagram not drawn to scale*

The points  $P$  and  $Q$  lie on a circle, with centre  $O$  and radius 12 cm, and  $\widehat{POQ} = 70^\circ$ .

(a) Calculate the length of the minor arc  $PQ$ .

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(b) Calculate the area of the shaded part of the circle.

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- 13. A wooden spike consists of a hemisphere, a cylinder and a cone, joined together as shown below.

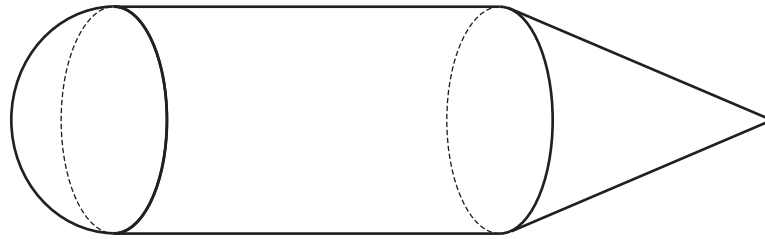


Diagram not drawn to scale

The radius of the cylinder is 5 cm and its length is 22 cm.  
The volume of the spike is 2382 cm<sup>3</sup>.

Calculate the length of the spike.

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