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|-----------------------|--|--|--|--|--|----------------------|--|--|--|--|--|
| Candidate<br>forename |  |  |  |  |  | Candidate<br>surname |  |  |  |  |  |
| Centre<br>number      |  |  |  |  |  | Candidate<br>number  |  |  |  |  |  |

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**  
**GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**B280B**

**MATHEMATICS C**  
**(GRADUATED ASSESSMENT)**

**MODULE M10 – SECTION B**

**TUESDAY 1 MARCH 2011: Morning**

**DURATION: 30 minutes**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**Candidates answer on the question paper.**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Geometrical instruments**

**Tracing paper (optional)**

**Scientific or graphical calculator**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

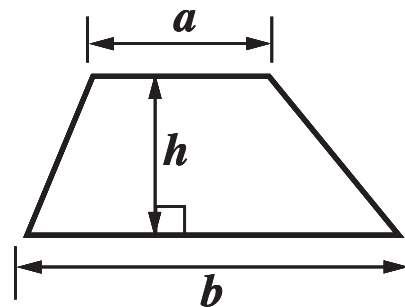
- Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Answer ALL the questions.

## **INFORMATION FOR CANDIDATES**

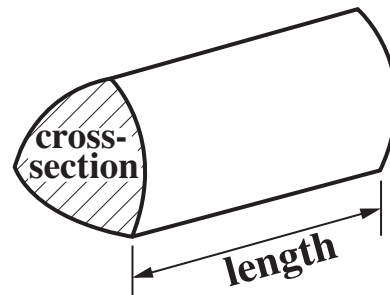
- The number of marks is given in brackets [ ] at the end of each question or part question.
- Section B starts with question 7.
- You are expected to use a calculator in Section B of this paper.
- Use the  $\pi$  button on your calculator or take  $\pi$  to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is 25.

# FORMULAE SHEET

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



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

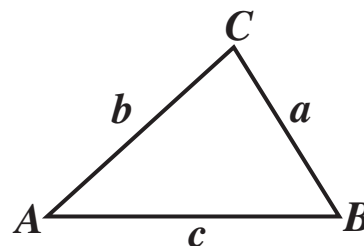


**In any triangle  $ABC$**

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

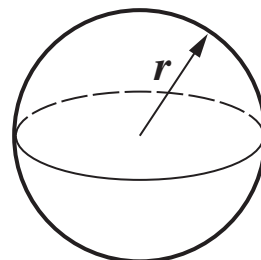
**Cosine rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

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



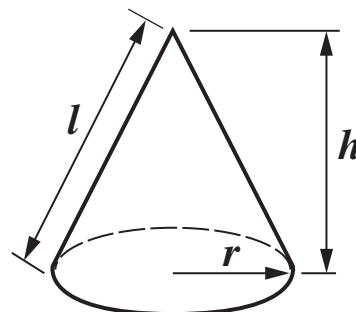
**Volume of sphere**  $= \frac{4}{3}\pi r^3$

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



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

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



**The Quadratic Equation**

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

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

- 7 During a recession, a house initially worth £300 000 was losing value at the rate of 1% per month. Assume this rate continued for over a year.**

**(a) Explain why the value lost in a year was NOT 12% of its value at the beginning of the year. [1 mark]**

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**(b) Calculate the value of the house at the end of the year. [3 marks]**

**(b) £** \_\_\_\_\_

**8 Solve this equation.**

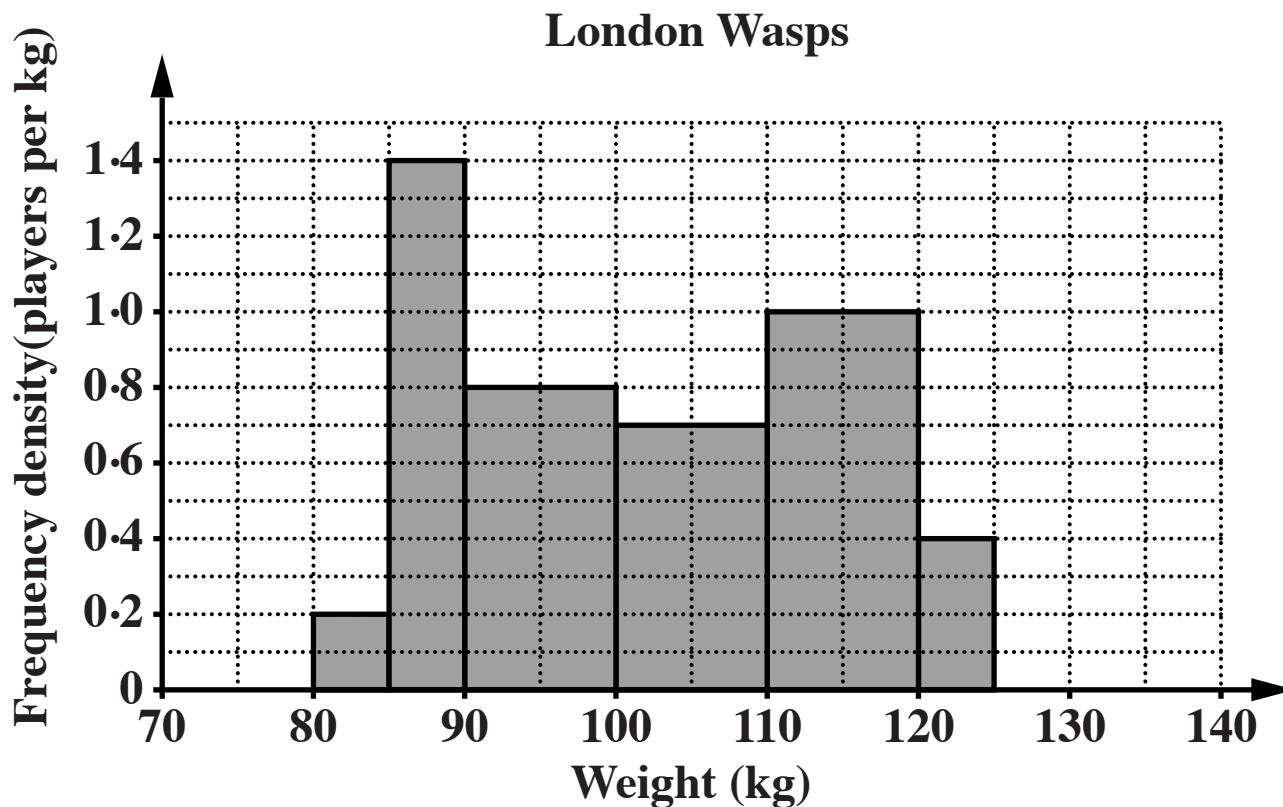
$$3x^2 + 7x - 4 = 0$$

**Give your answers correct to 2 decimal places. [3 marks]**

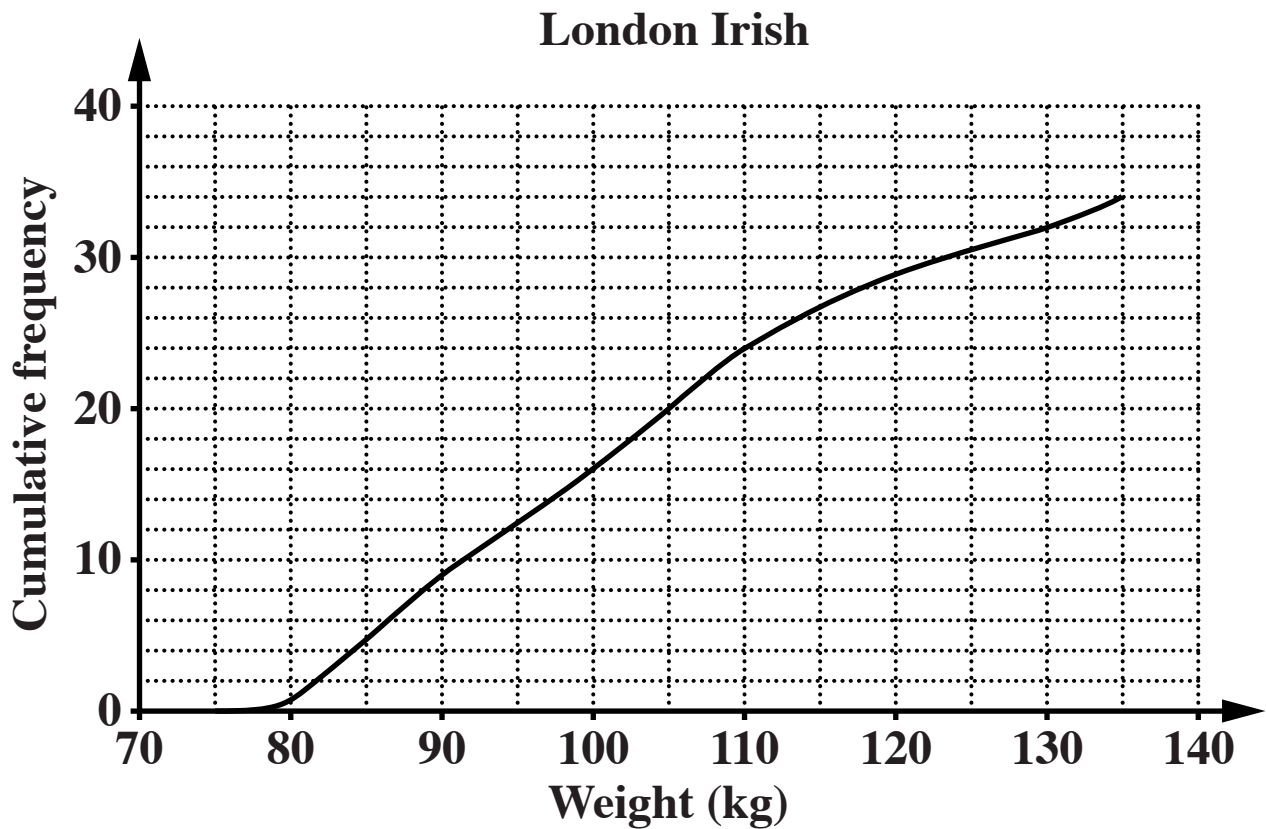
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**9 London Wasps and London Irish are two rugby clubs.**

**This histogram represents the weights of the players in the first team squad for London Wasps during the 2008 to 2009 season.**



**This cumulative frequency diagram represents the weights of the players in the first team squad for London Irish during the 2008 to 2009 season.**



- (a) How many of the London Wasps players weighed between 80 and 90 kg? [1 mark]**

**(a)** \_\_\_\_\_

- (b) How many players were in the London Irish first team squad? [1 mark]**

**(b)** \_\_\_\_\_

- (c) **Make comments comparing the average and spread of these distributions.**  
**State clearly the evidence you are using. [4 marks]**

**Average:** \_\_\_\_\_

\_\_\_\_\_

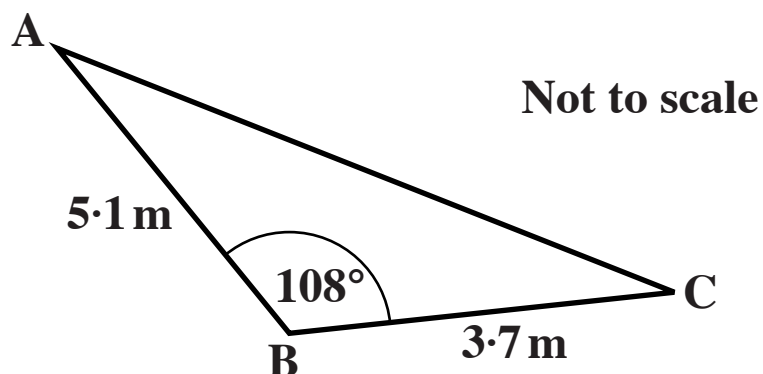
\_\_\_\_\_

**Spread:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- 10** Three trees in a garden are at A, B and C.  
 **$AB = 5.1 \text{ m}$ ,  $BC = 3.7 \text{ m}$  and angle  $ABC = 108^\circ$ .**



**A bird flies horizontally straight from A to B, then from B to C.**

**How much further does it fly than if it flies directly from A to C?**

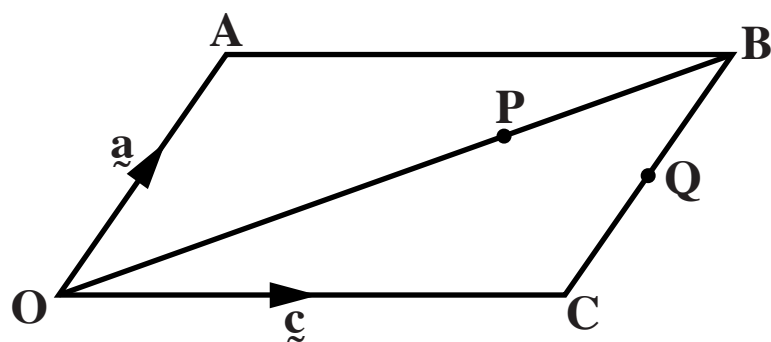
**Give your answer to a sensible degree of accuracy.**

**[4 marks]**

\_\_\_\_\_ m

11 **OABC is a parallelogram.**

**$\vec{OA} = \mathbf{a}$  and  $\vec{OC} = \mathbf{c}$ .**



**Not to scale**

**P is the point on OB such that  $OP = \frac{2}{3} OB$ .**

**(a) Show that  $\vec{AP} = \frac{2}{3} \mathbf{c} - \frac{1}{3} \mathbf{a}$ . [2 marks]**

**Q is the midpoint of BC.**

**(b) Express  $\vec{AQ}$  in terms of  $\mathbf{a}$  and  $\mathbf{c}$ . [1 mark]**

**(b)** \_\_\_\_\_

**(c) Explain how you can tell that APQ is a straight line.  
[1 mark]**

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**12 Jean and Colin are given a box containing 25 chocolates to share.**

**5 are white chocolates,  
8 are plain chocolates and  
12 are milk chocolates.**

**Jean takes a chocolate at random and eats it.  
Then Colin takes a chocolate at random and eats it.**

**Calculate the probability that at least one of these two chocolates is a plain chocolate. [4 marks]**

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