M10

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RECOGNISING ACHIEVEMENT

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS C (GRADUATED ASSESSMENT)

B280B

MODULE M10 – SECTION B

Candidates answer on the question paper.

OCR supplied materials:
None

Other materials required:
• Geometrical instruments
• Tracing paper (optional)
• Scientific or graphical calculator

Tuesday 1 March 2011
Morning

Duration: 30 minutes

Candidate forename		Candidate surname	

| Centre number						Candidate number				

MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

• Write your name, centre number and candidate number in the boxes above. 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.
• Do **not** write in the bar codes.

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 π button on your calculator or take π to be 3·142 unless the question says otherwise.
• The total number of marks for this Section is **25**.
• This document consists of **8** pages. Any blank pages are indicated.

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Turn over

Formulae Sheet

Area of trapezium $= \frac{1}{2}(a+b)h$
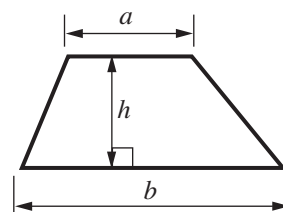
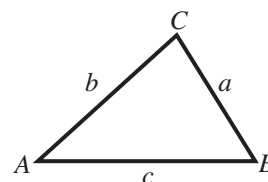**Volume of prism** = (area of cross-section) × length
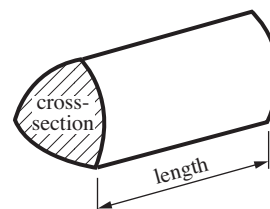
In any triangle ABC

Sine rule $\quad \dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$
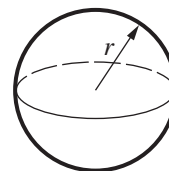
Cosine rule $\quad a^2 = b^2 + c^2 - 2bc\cos A$

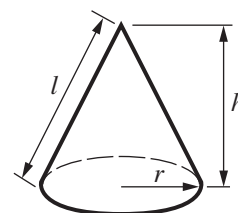**Area of triangle** $= \frac{1}{2}ab\sin C$

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

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

PLEASE DO NOT WRITE ON THIS PAGE

7 A house initially worth £300 000 was losing value at the rate of 1% per month during a recession. 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]**

(b) Calculate the value of the house at the end of the year.

(b) £ .... **[3]**

8 Solve this equation.

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

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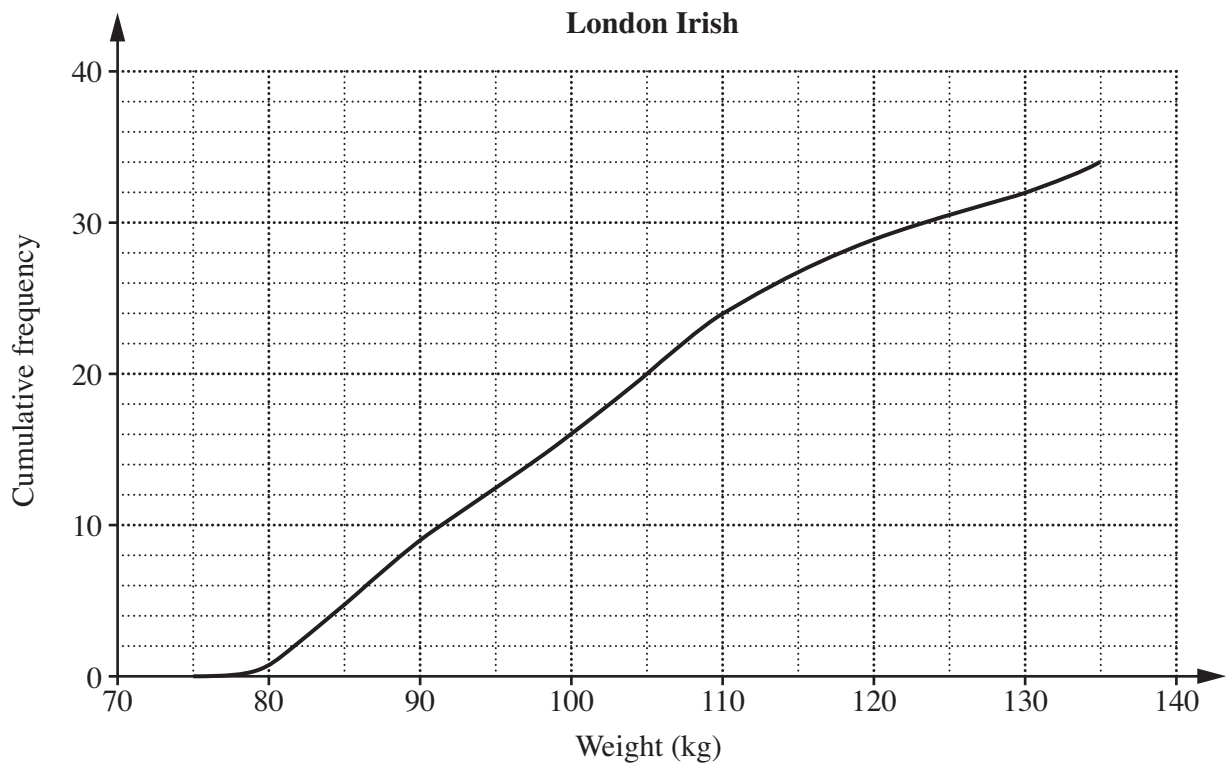
....**[3]**

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.
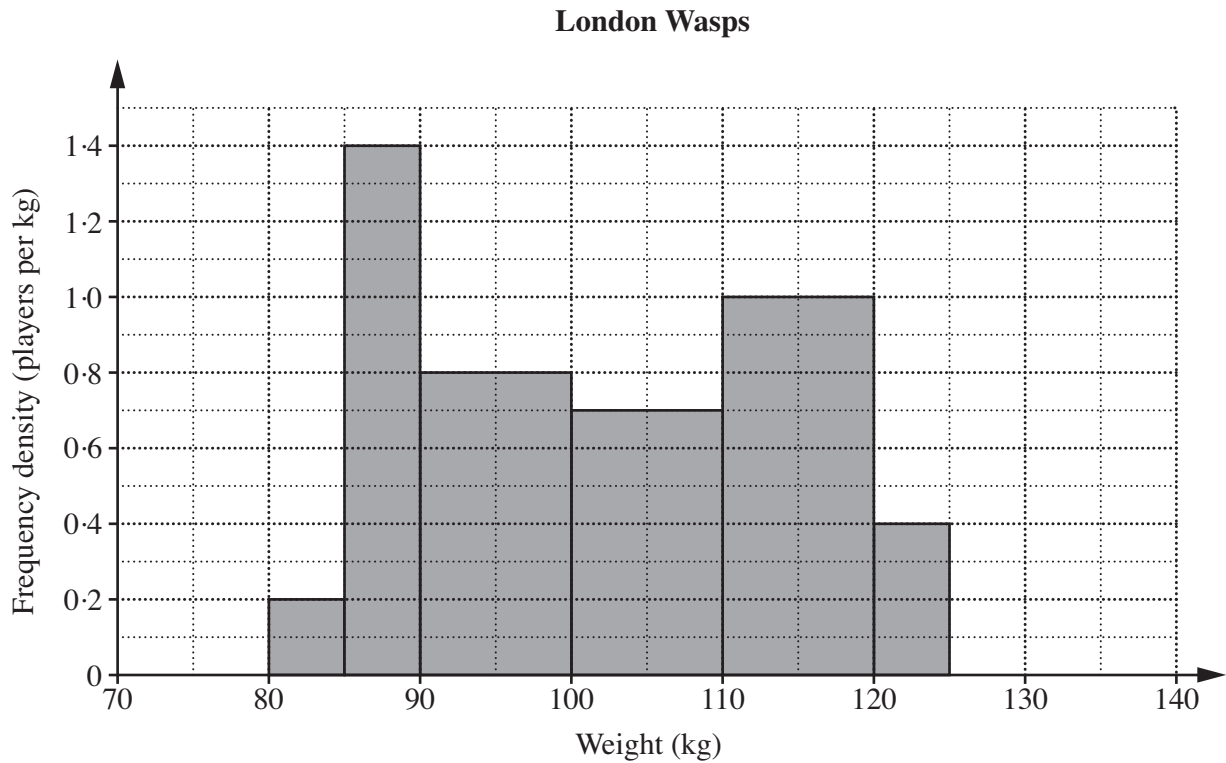
London Wasps

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

London Irish

(a) How many of the London Wasps players weighed between 80 and 90 kg?

(a) ....[1]

(b) How many players were in the London Irish first team squad?

(b) ....[1]

(c) Make comments comparing the average and spread of these distributions.
State clearly the evidence you are using.
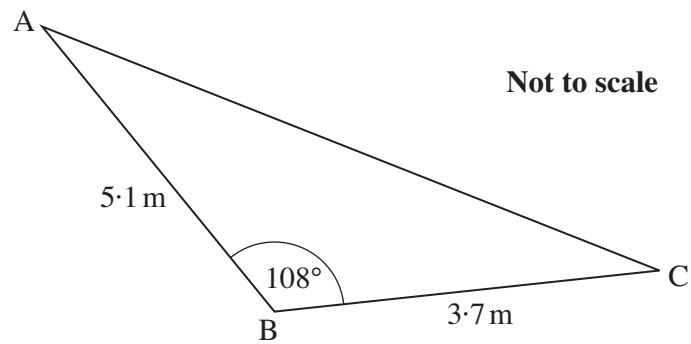
Average: ....

....

....

Spread: ....

....

....**[4]**

Turn over

10 Three trees in a garden are at A, B and C.
AB = 5·1 m, BC = 3·7 m and angle ABC = 108°.

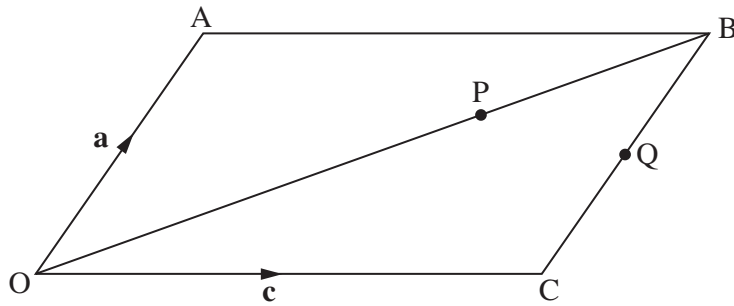A   **Not to scale**

5·1 m

108°

B   3·7 m   C

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

How much further does it fly taking this route than if it flies directly from A to C?
Give your answer to a sensible degree of accuracy.

....m **[4]**

11 OABC is a parallelogram.
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OC} = \mathbf{c}$.

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

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

Q is the midpoint of BC.

(b) Express $\overrightarrow{AQ}$ in terms of **a** and **c**.

(b) ....[1]

(c) Explain how you can tell that APQ is a straight line.

....

....[1]

TURN OVER FOR QUESTION 12

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]**