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OCR
RECOGNISING ACHIEVEMENT

Wednesday 11 January 2012 – Morning

GCSE MATHEMATICS C (GRADUATED ASSESSMENT)

B282B   Terminal Paper – Section B (Higher Tier)

Candidates answer on the Question Paper.	
OCR supplied materials: None	**Duration:** 1 hour
Other materials required: • Geometrical instruments • Tracing paper (optional) • Pie chart scale (optional) • Scientific or graphical calculator	

Candidate forename		Candidate surname	

| Centre number					Candidate number				

INSTRUCTIONS TO CANDIDATES
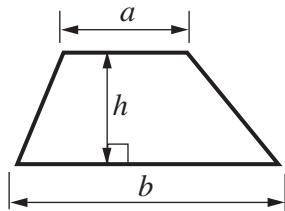
*   Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
*   Use black ink. HB pencil may be used for graphs and diagrams only.
*   Answer **all** the questions.
*   Read each question carefully. Make sure you know what you have to do before starting your answer.
*   Show your working. Marks may be given for a correct method even if the answer is incorrect.
*   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).
*   Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES
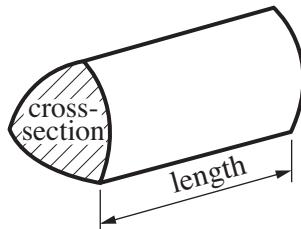
*   The number of marks is given in brackets **[ ]** at the end of each question or part question.
*   Section B starts with question 13.
*   You are expected to use a calculator in Section B of this paper.
*   Use the π button on your calculator or take π to be 3·142 unless the question says otherwise.
*   The total number of marks for this Section is **50**.
*   This document consists of **16** 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) $\times$ length
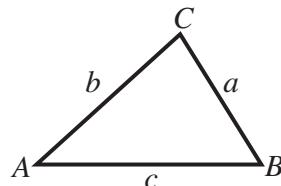
In any triangle ABC

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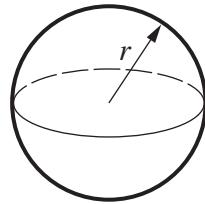
Cosine rule $\quad a^2 = b^2 + c^2 - 2bc \cos A$

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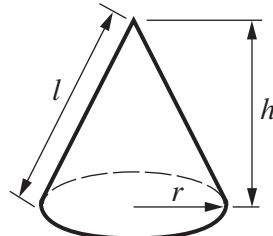

Volume of sphere $= \frac{4}{3} \pi r^3$

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

13 In the 2006/7 season the average attendance at home league games of Leeds United was 20 831.

    (a) In the 2007/8 season the average attendance increased by 27% of the 2006/7 figure.

        What was the average attendance in the 2007/8 season?

        (a) ....**[3]**

    (b) The average attendance in 2006/7 was 7% lower than in the 2005/6 season.

        What was the average attendance in the 2005/6 season?

        (b) ....**[3]**

   **(c)** For one game, the local newspaper reported:
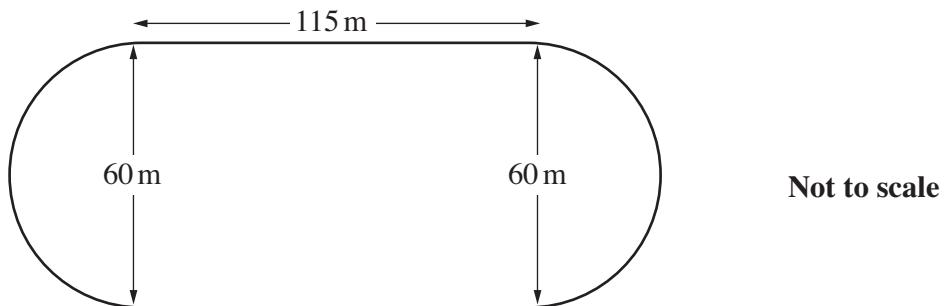
25 000 at game

        This figure was correct to the nearest thousand.

        Complete this statement:

        The attendance at the game was between .... and ....   **[2]**

                    Turn over

14 (a) This diagram shows a running track with two straight sections and semi-circular ends.
The length of each straight section is 115 m and the diameter of each semi-circular end is 60 m.

Calculate the distance around the track.
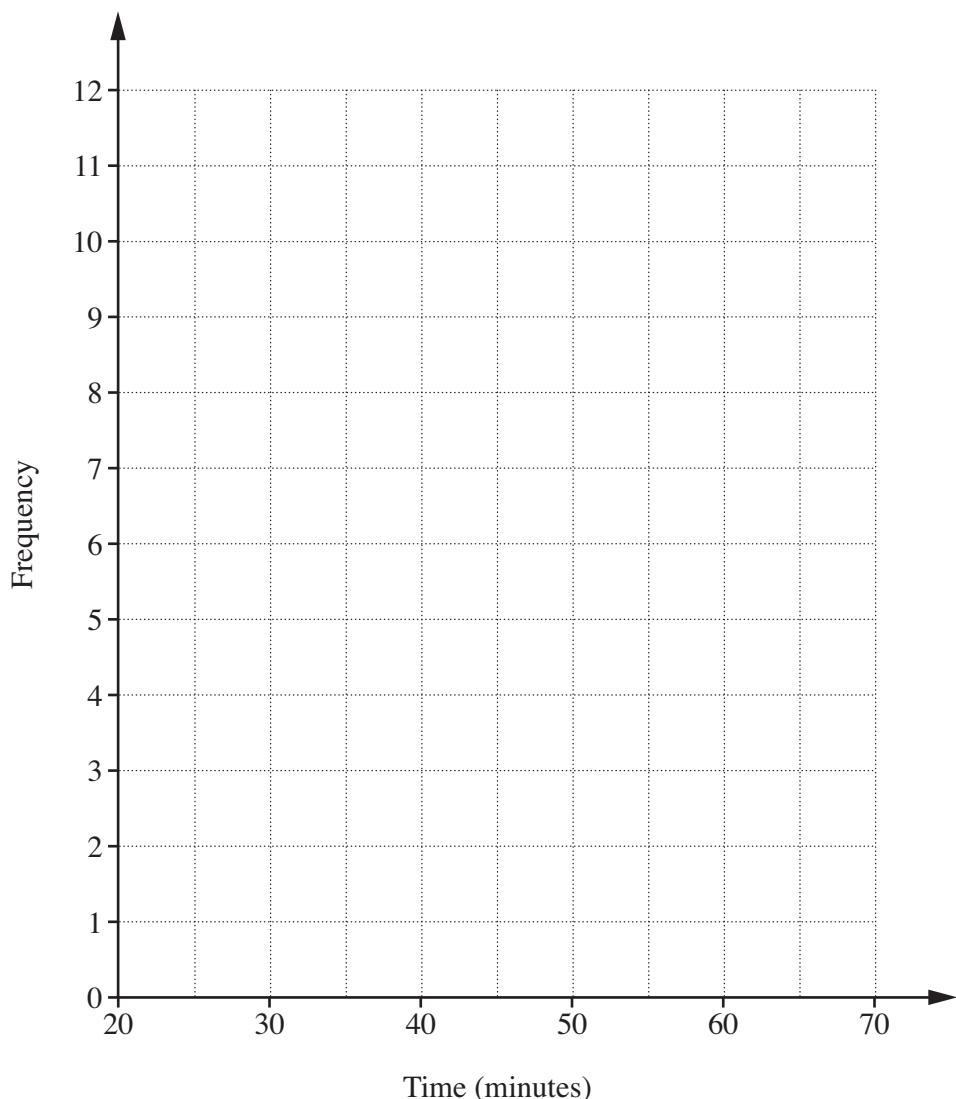
(a) ....m **[3]**

(b) The track is used for a sponsored 5 km walk.
These are the times, to the nearest minute, of 30 walkers.

25	27	27	28	32	32	35	39	41	41
42	42	45	45	47	48	48	48	51	51
57	58	58	59	62	64	65	65	67	68

Using suitable class intervals, draw a frequency polygon to represent these data.

[3]

15 A firm has 90 employees.

(a) (i) This table summarises information about their absence during one year.

	5 days or fewer	More than 5 days
Male	36	16
Female	25	13

What percentage of the employees was absent for more than 5 days?

(a)(i) ....% **[2]**

(ii) This table summarises the absence data in a percentage form.

	5 days or fewer	More than 5 days
Male	69%	31%
Female	66%	34%

Describe what the circled entry represents.

....**[1]**

(b) This table summarises the distribution of the number of days' absence for all 90 employees.

Number of days	Number of employees
0 – 2	37
3 – 5	24
6 – 10	17
11 – 35	12
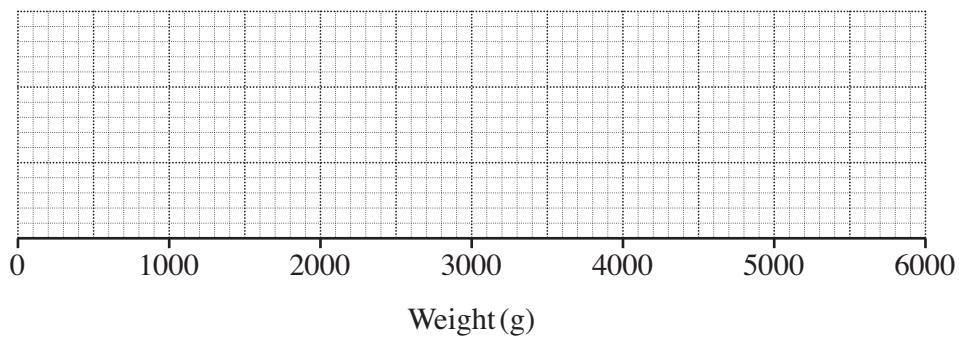
Calculate an estimate of the mean number of days' absence.

(b) ....[4]

Turn over

16 This table gives information about the weights of babies born at Victoria Maternity Hospital.
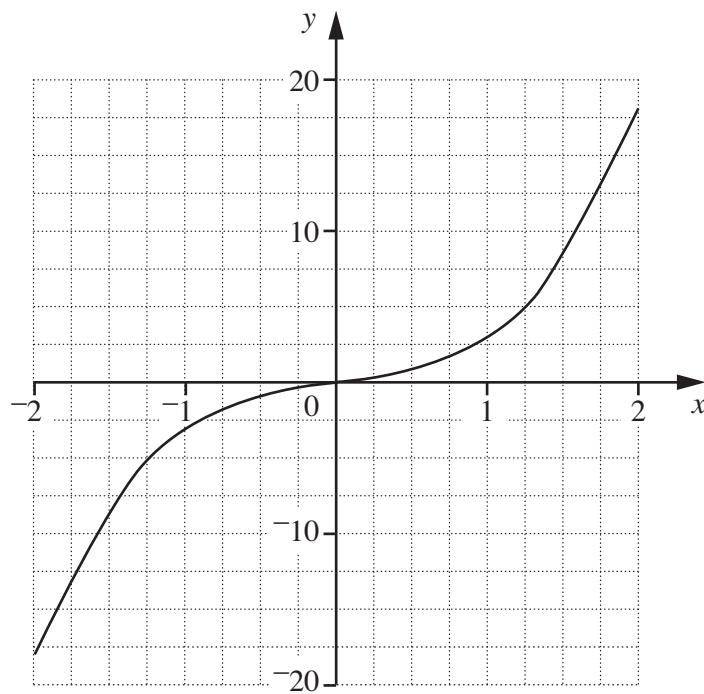
Minimum weight	1200 g
Maximum weight	5000 g
Median weight	3100 g
Lower quartile	2700 g
Interquartile range	900 g

Draw a box plot on the grid to show the distribution of the weights.

Weight (g)

[3]

**17** This is a graph of $y = 2x^3 + x$ for $^-2 \leqslant x \leqslant 2$.
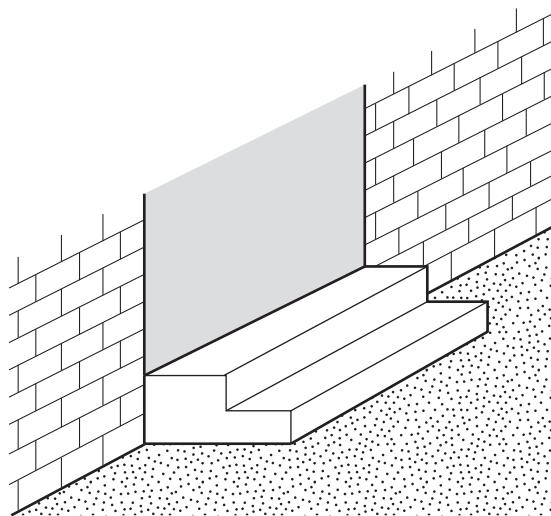
Use trial and improvement to solve $2x^3 + x = 4$, giving your answer correct to 2 decimal places.
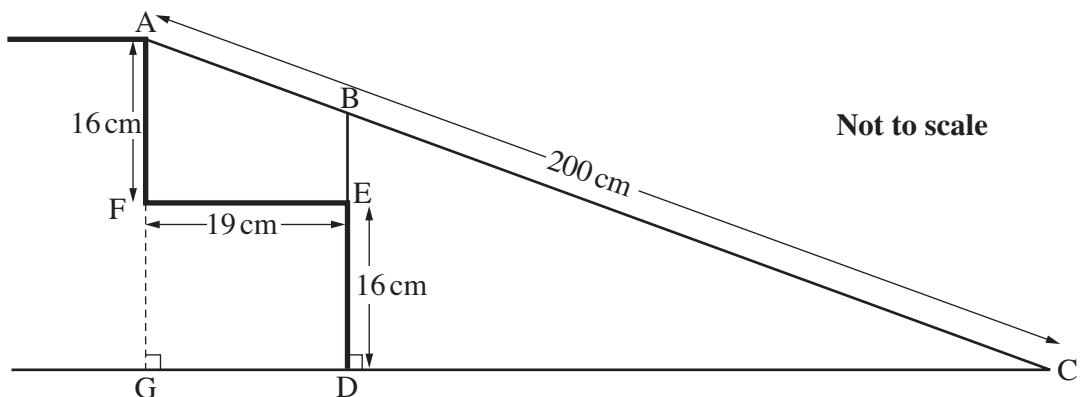
You must show all your trials and their outcomes.

....[4]

18 There are two steps to Gareth's house.
He decides to fit a wooden ramp for wheelchair access.

This is the cross-section of the steps and the ramp.
The ramp is 200 cm long and is supported by the strut BE.

Not to scale

**(a)** Calculate DC, the horizontal distance the ramp extends beyond the bottom step.

(a) ....m **[4]**
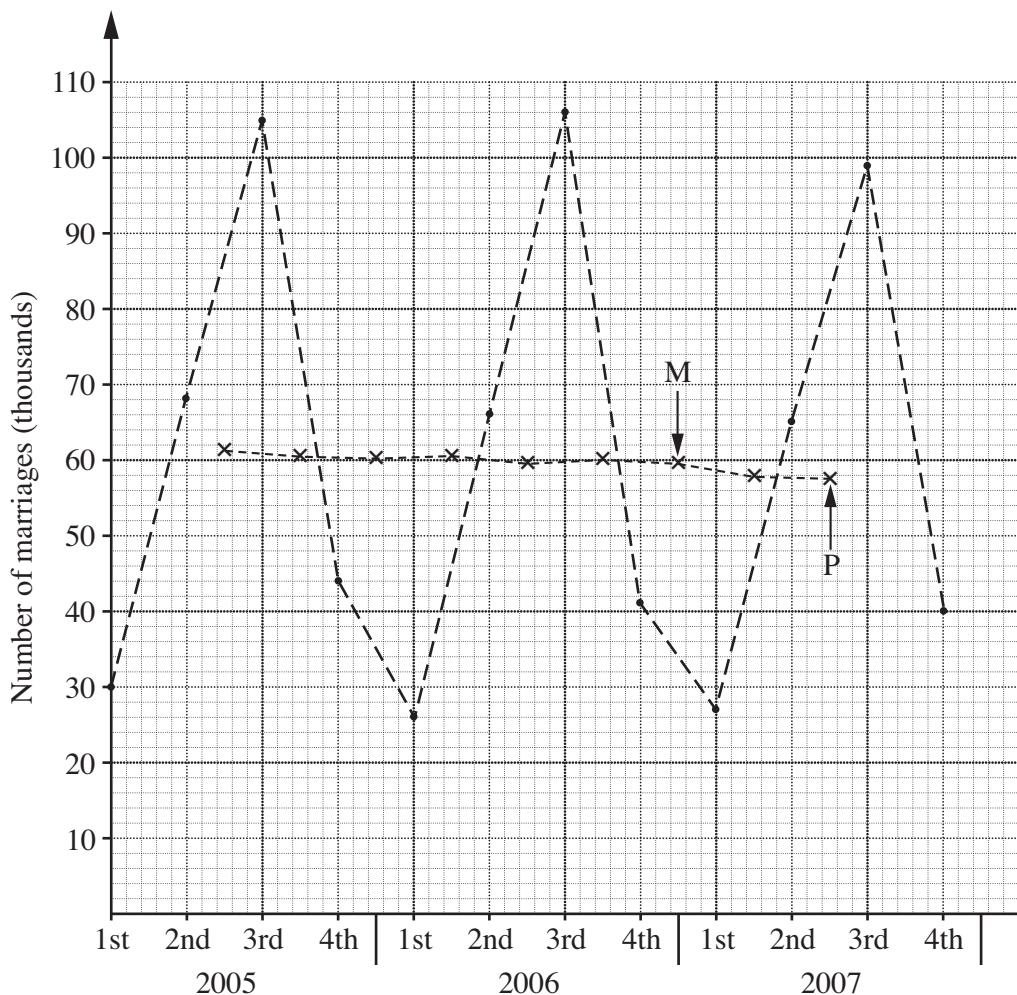
(b) Calculate angle ACD, the angle of inclination of the ramp.

(b) ....° **[3]**

Turn over

19 This table shows the number of marriages recorded in England and Wales for each quarter in 2005, 2006 and 2007.

Year	2005				2006				2007			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Number of marriages (thousands)	30	68	105	44	26	66	106	41	27	65	99	40

These data (•) have been plotted on the grid along with the 4-quarter moving averages (✗).

(a) One of the moving averages has been marked M.

Show how this moving average has been calculated.

....

....

....[1]
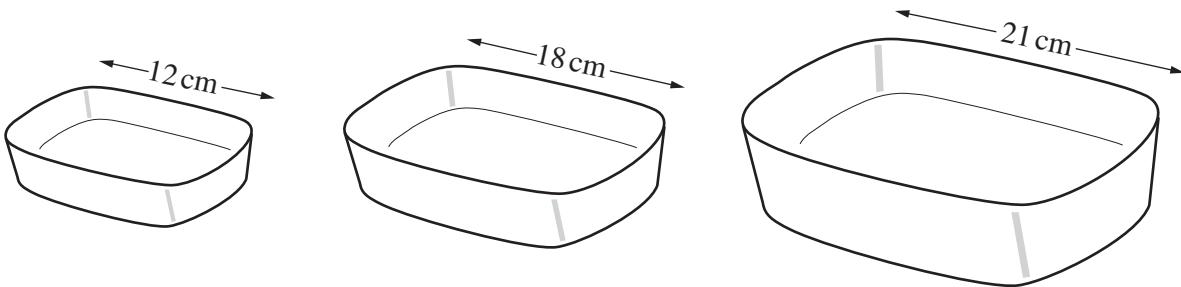
(b) (i) Use the graph to estimate the next moving average after P.

(b)(i) .... thousand **[1]**

(ii) Hence estimate the number of marriages for the first quarter of 2008.
Show your working clearly.

(ii) .... thousand **[2]**

20 This is a set of three casserole dishes.

The dishes are mathematically similar.
The lengths of the dishes are 12 cm, 18 cm and 21 cm.

(a) The depth of the largest dish is 9·4 cm.

What is the depth of the smallest dish?
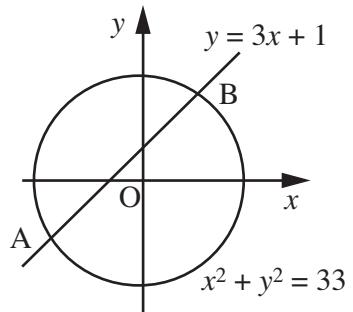
(a) .... cm **[2]**

(b) The capacity of the middle dish is 2·2 litres.

What is the capacity of the largest dish?

(b) .... litres **[2]**

21 The graphs of $y = 3x + 1$ and $x^2 + y^2 = 33$ intersect at A and B.

Not to scale

(a) Show that $5x^2 + 3x - 16 = 0$ at A and B.

[3]

(b) Solve the equation $5x^2 + 3x - 16 = 0$ to find the coordinates of A.
Give the coordinates correct to 1 decimal place.

(b) A (........................ , ...) **[4]**

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