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**GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS C (GRADUATED ASSESSMENT)**

B282B

Terminal Paper – Section B (Higher Tier)

Candidates answer on the question paper.

OCR supplied materials:
None

Other materials required:

- Geometrical instruments
- Tracing paper (optional)
- Scientific or graphical calculator

**Tuesday 11 January 2011
Morning**

Duration: 1 hour



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

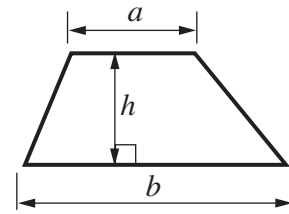
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer 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

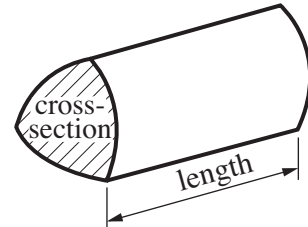
- The number of marks is given in brackets [] at the end of each question or part question.
- Section B starts with question 12.
- You are expected to use a calculator in Section B of this paper.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is **50**.
- This document consists of **12** pages. Any blank pages are indicated.

Formulae Sheet

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



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

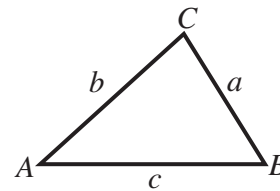


In any triangle ABC

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

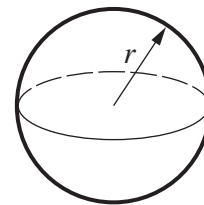
$$\text{Cosine rule} \quad a^2 = b^2 + c^2 - 2bc \cos A$$

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



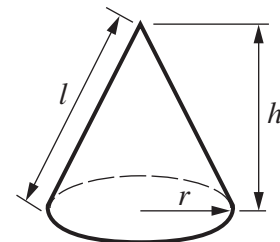
$$\text{Volume of sphere} = \frac{4}{3} \pi r^3$$

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



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

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



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

- 12 This formula converts temperature between degrees Fahrenheit and degrees Celsius.

$$C = \frac{5(F - 32)}{9}$$

C is the temperature in degrees Celsius and F is the temperature in degrees Fahrenheit.

In 1982 a temperature of -15 degrees Fahrenheit was recorded in England.

Use the formula to work out what -15°F is in degrees Celsius.
Give your answer correct to the nearest whole number.

..... $^{\circ}\text{C}$ [3]

- 13 In 2003 there were 55 700 pairs of puffins on the Farne Islands.
By 2008 there were only 36 500 pairs of puffins.

Calculate the percentage reduction in the number
of pairs of puffins.



..... % [3]

- 14 (a)** The Avon cricket pitch is circular.
The diameter of the pitch is 140 m.

Work out the distance round the pitch.

Give your answer correct to a suitable degree of accuracy.

(a) m **[3]**

- (b)** In one match the Avon cricket team scores 51 runs in the first 6 overs.

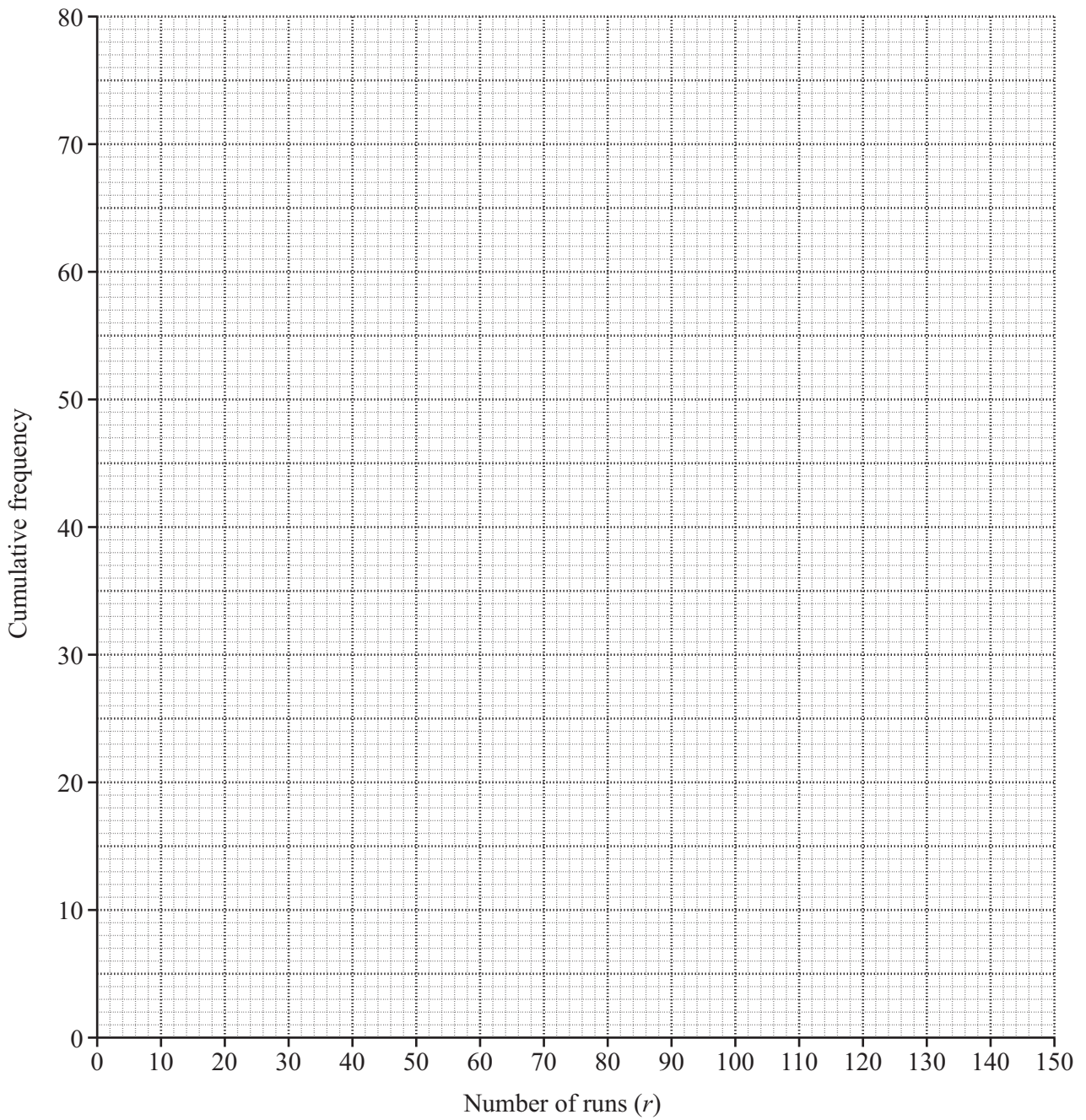
Assuming that the team continues to score at the same rate,
how many runs will the team score in 20 overs?

(b) **[2]**

- (c) (i)** Kevin has kept a record of the number of runs he has scored in 80 matches.
This table shows the distribution of the number of runs he has scored.

Number of runs (r)	Frequency (number of matches)
$0 \leq r \leq 20$	14
$20 < r \leq 40$	20
$40 < r \leq 60$	20
$60 < r \leq 80$	14
$80 < r \leq 100$	6
$100 < r \leq 150$	6

Draw a **cumulative frequency** graph to represent this distribution.

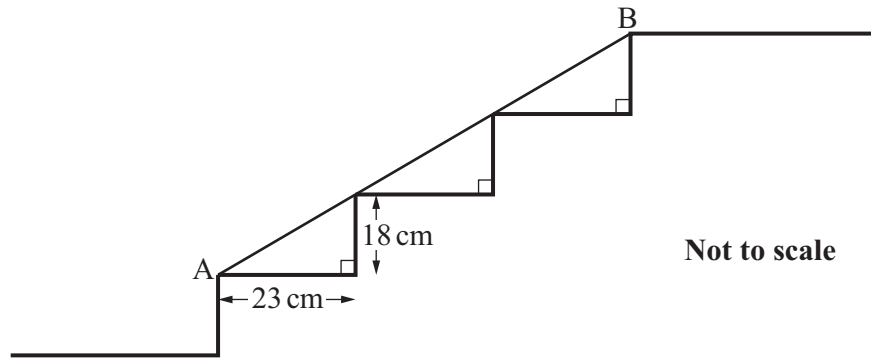


[4]

(ii) Use the graph to estimate the number of matches in which Kevin scored more than 50 runs.

(c)(ii) [2]

- 15 This is the side view of a set of steps.
 Each step is the same width and height.
 A piece of wood is fitted from A to B as shown.



Work out the length AB.

.....cm [4]

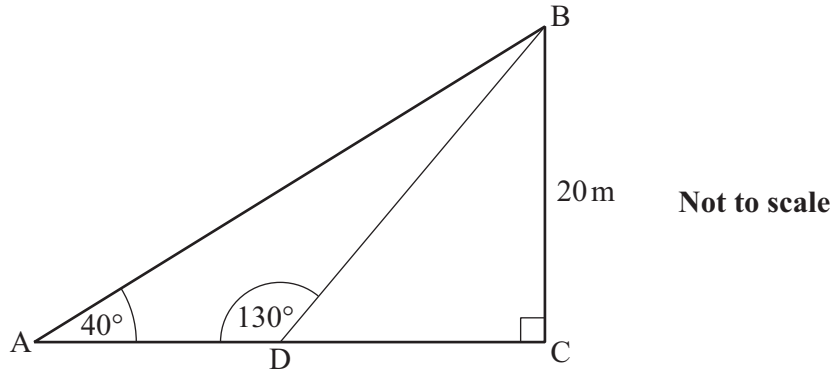
16 Solve algebraically these simultaneous equations.

$$4x - 3y = 24$$

$$6x + 5y = 17$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots [4]$$



ADC is a straight line.
 Angle $BCA = 90^\circ$, angle $BDA = 130^\circ$ and angle $BAD = 40^\circ$.
 $BC = 20\text{ m}$.

(a) Show that $AB = 31\text{ m}$, correct to the nearest metre.

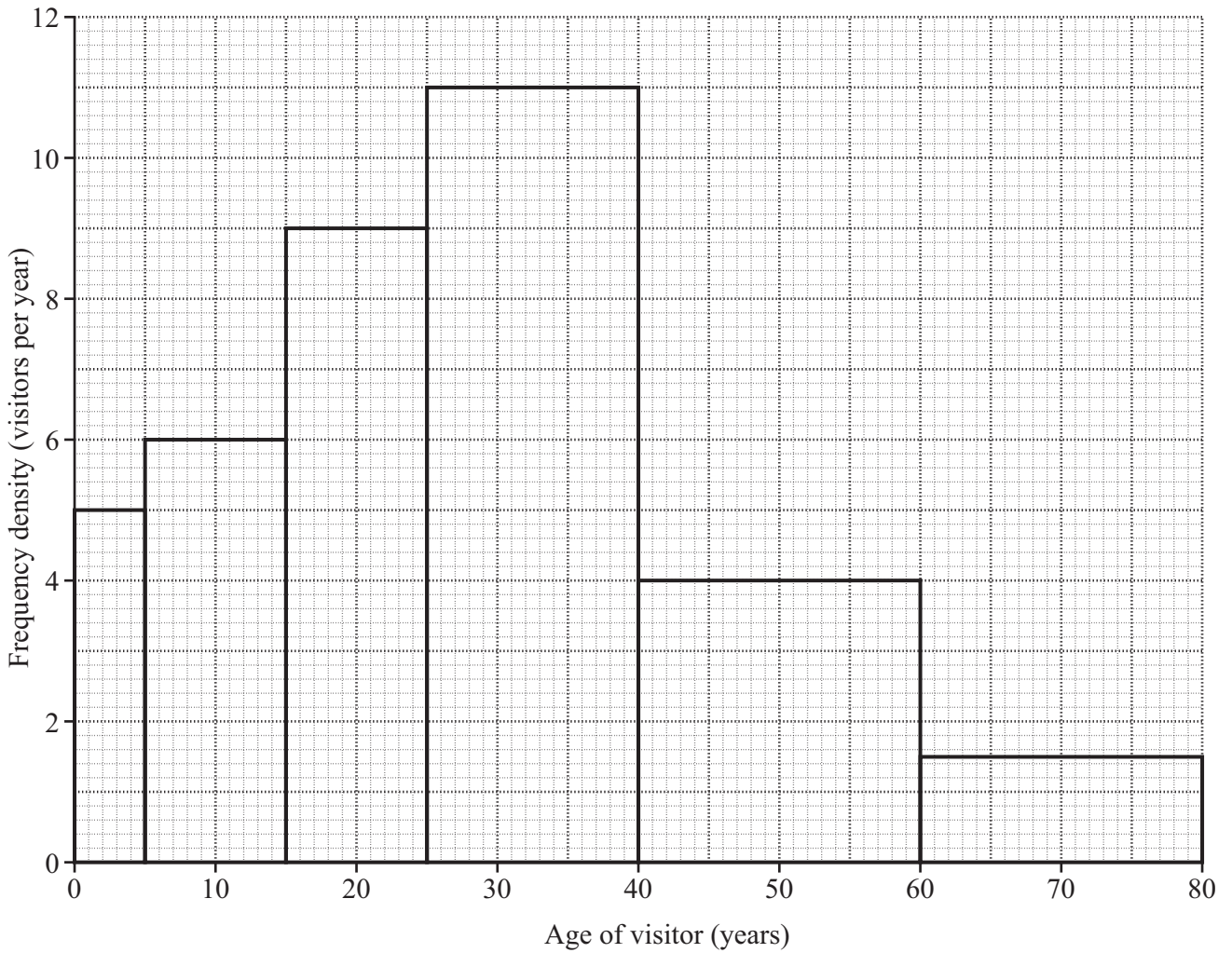
.....

 [2]

(b) Calculate AD.

(b) m [3]

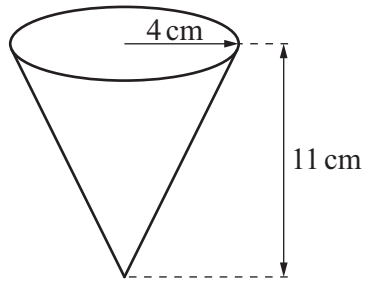
18 This histogram shows the distribution of the ages of the 450 visitors to a leisure centre one Saturday morning.



What percentage of the visitors were aged under 15?

..... % [3]

19 This drinks cup is a cone.

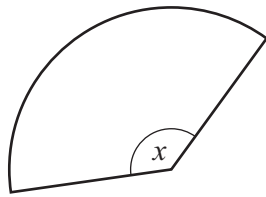


The radius of the cone is 4 cm and the depth is 11 cm.

(a) How many of these cups can be completely filled from a 20 litre container of water?

(a) [4]

(b) The cone is made from a sector of a circle.



Not to scale

(i) Show that the radius of this sector is 11.7 cm, correct to 1 decimal place.

.....
.....
.....
..... [2]

(ii) Calculate angle x .

(b)(ii) [4]

TURN OVER FOR QUESTIONS 20 AND 21

20 It is given that y is inversely proportional to x^2 and that $y = 4$ when $x = 5$.

Find the formula for y in terms of x .

..... [3]

21 Ric estimated that the distance from the airport to his holiday home was about 260 kilometres and that the journey would take about 4 hours.

He estimated the distance to the nearest 10 km and the time to the nearest hour.

Calculate the **lower bound** of his average speed for this journey.

.....km/hour [4]

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