Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION

B282B

MATHEMATICS C (GRADUATED ASSESSMENT)

Terminal Paper – Section B (Higher Tier)

MONDAY 7 JUNE 2010: Afternoon
DURATION: 1 hour

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

DC (LEO/DJ) MEP60068 27444/2
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INSTRUCTIONS TO CANDIDATES

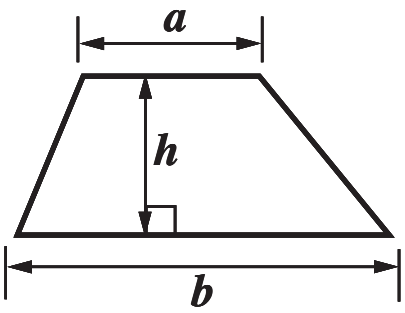
- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully and make sure that you know what you have to do before starting your answer.**
- **Show your working. Marks may be given for a correct method even if the answer is incorrect.**
- **Answer ALL the questions.**
- **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).**

INFORMATION FOR CANDIDATES

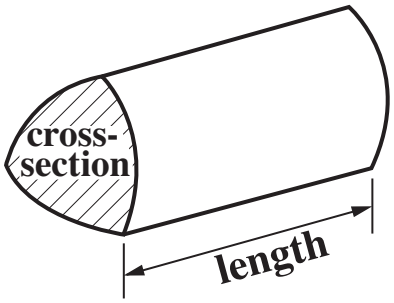
- **The number of marks is given in brackets [ ] at the end of each question or part question.**
- **Section B starts with question 11.**
- **You are expected to use a calculator in Section B of this paper.**
- **Use the π button on your calculator or take π to be 3·142 unless the question says otherwise.**
- **The total number of marks for this Section is 50.**

FORMULAE SHEET

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



Volume of prism = (area of cross-section) × length

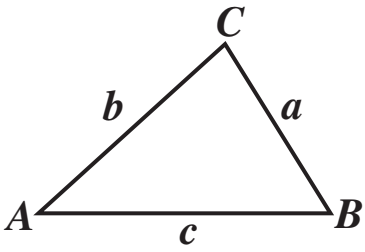


In any triangle ABC

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

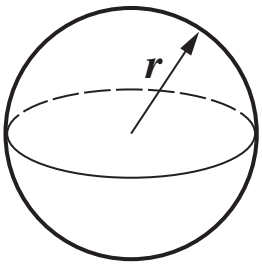
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



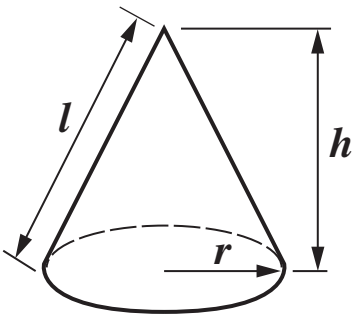
Volume of sphere $= \frac{4}{3}\pi r^3$

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



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

Curved surface area of cone $= \pi rl$

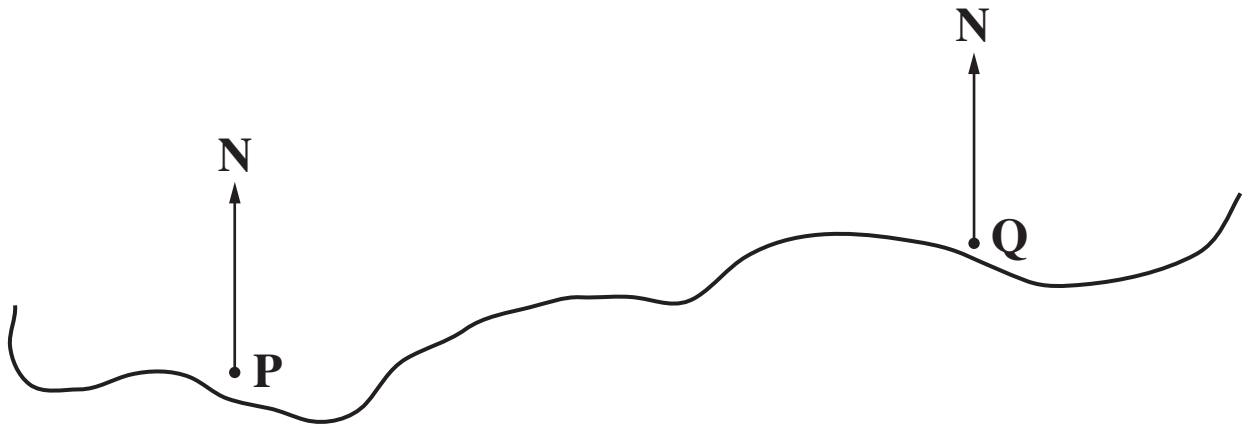


The Quadratic Equation

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

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

11 The map shows two viewpoints, P and Q, on an island.



A boat is seen on a bearing of 126° from P and 208° from Q.

Construct on the map the position of the boat.
Label it B.
[3 marks]

12 Calculate.

$$\frac{54 \cdot 1 - 30 \cdot 98}{19 \times 0 \cdot 4}$$

Give your answer correct to 2 decimal places.
[2 marks]

13 (a) Multiply out.

$5(x - 4)$

[1 mark] **(a)** _____

(b) Factorise.

$x^2 + 3x$

[1 mark] **(b)** _____

(c) Rearrange $y = 5x - 2$ to make x the subject.
[2 marks]

(c) _____

14 This table gives information about three burgers.

	Total Weight (g)	Carbohydrate (g)
Bumper burger	**274**	**47**
Cheese burger	**173**	**29**
Veggie burger	**252**	**54**

Which of these burgers has the highest percentage of carbohydrate by weight?
Show your working clearly.
[3 marks]

15 There are three businesses in an office block.
The three businesses decide to share the cleaning costs in the ratio of the number of their employees.

- **Ace Accountancy has 16 employees**
- **Basic Insurance has 12 employees**
- **Classic Finance has 20 employees**

(a) Write the ratio 16 : 12 : 20 in its simplest form.
[1 mark]

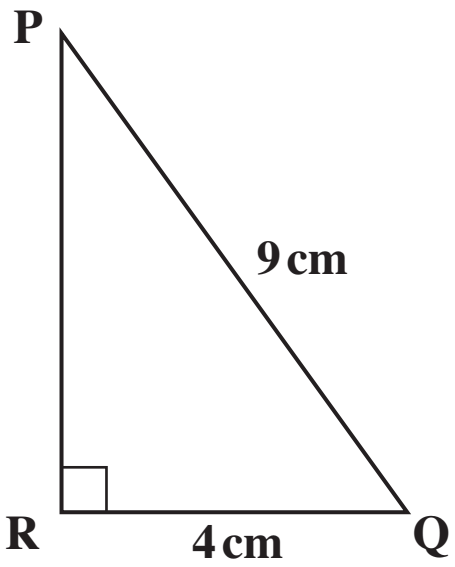
(a) _____ : _____ : _____

(b) The cleaning cost is £42 000.

Work out how much of this cost Classic Finance pays.
[2 marks]

(b) £ _____

16



Not to scale

Calculate PR.
[3 marks]

_____ **cm**

17 A firm records the distances that 50 employees travel to work.
This table summarises the results.

Distance (d miles)	Frequency
$0 < d \leqslant 5$	22
$5 < d \leqslant 10$	13
$10 < d \leqslant 20$	8
$20 < d \leqslant 40$	7

(a) Give a reason for choosing unequal class widths.
[1 mark]

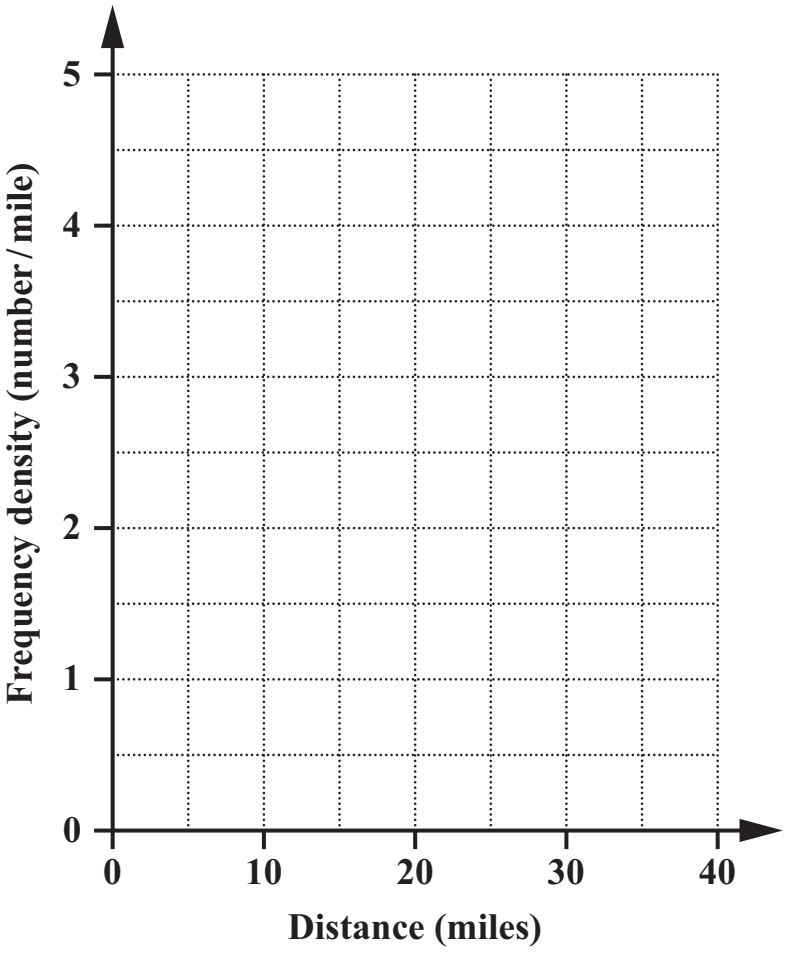
_____

_____

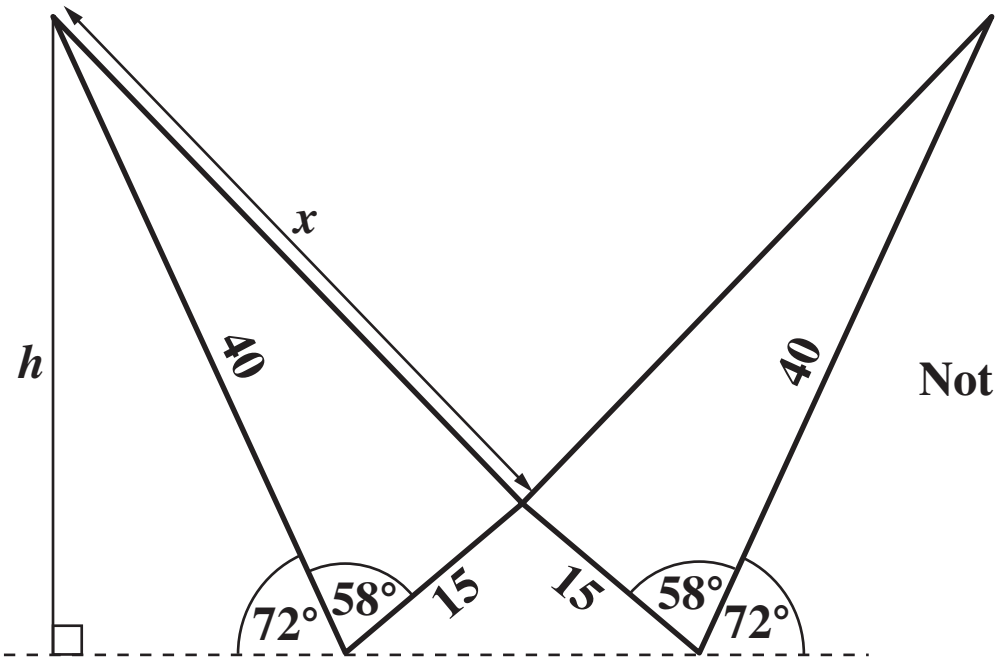
(b) Calculate an estimate of the mean distance travelled.
[4 marks]

(b) _____ miles

(c) Draw a histogram to show the distribution of the distances that the employees travel to work.
[3 marks]



18 This is a sketch of the logo for WV bikes.
All lengths are in millimetres.



Not to scale

(a) Calculate the height, *h*, of the logo.
[3 marks]

(a) _____ mm

(b) Calculate the length marked *x*.
[3 marks]

(b) _____ mm

19 In September 2005 the total area of ice in the Arctic was $5{\cdot}3 \times 10^6$ km^2.
The total land area of Germany is $3{\cdot}5 \times 10^5$ km^2.

(a) In September 2005, how many times as big as Germany was the area of ice in the Arctic?
[2 marks]

(a) _____

(b) By September 2006, the area of ice had decreased by 12% of its September 2005 area.
By September 2007, the area of ice had decreased by 12% of its September 2006 area.

What was the area of ice in September 2007?
[2 marks]

(b) _____ km^2

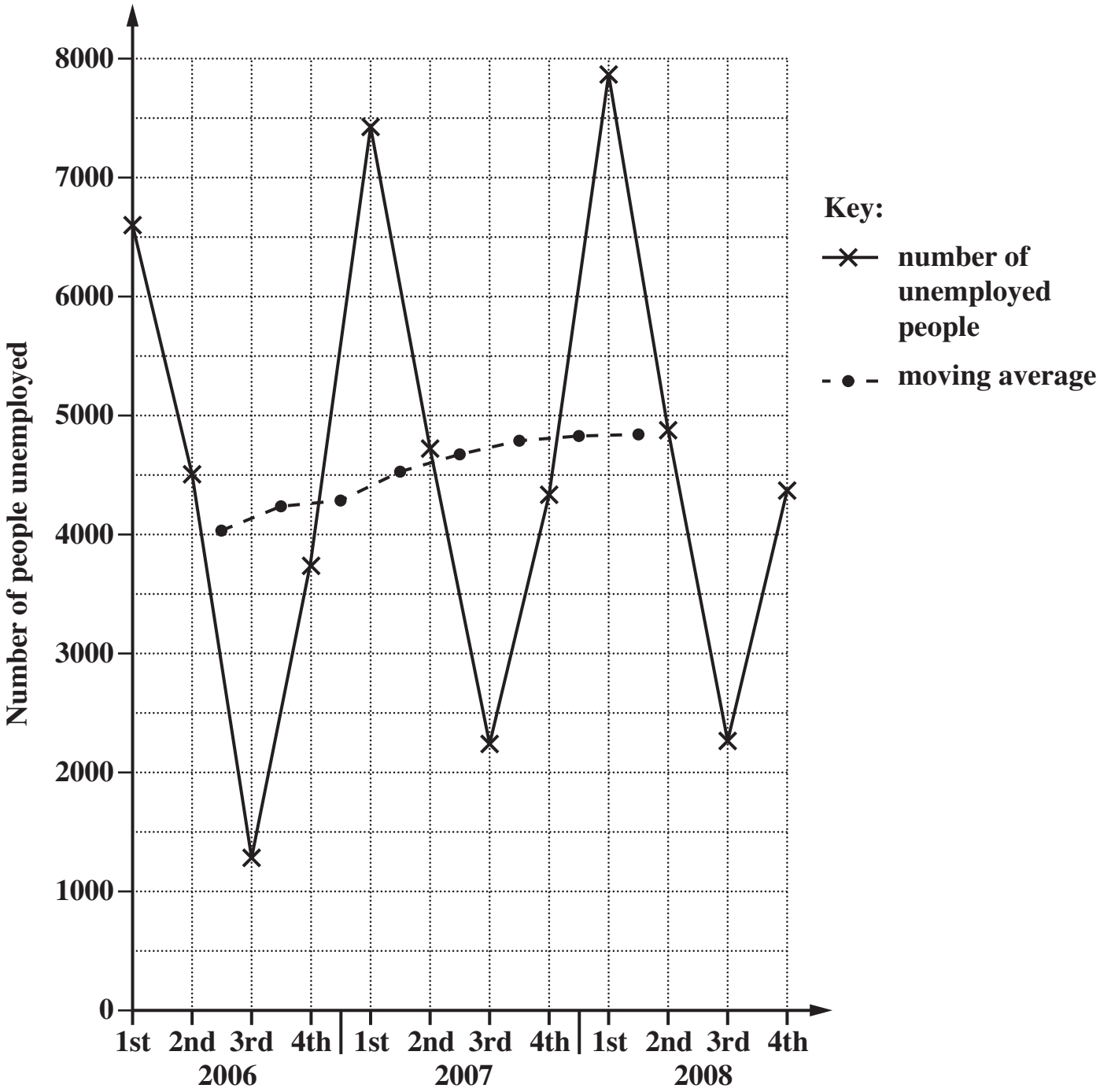
(c) Assume that the area of ice in the Arctic continues to decrease at a rate of 12% each year.

In the September of <u>WHICH YEAR</u> will the area of ice first be smaller than the land area of Germany?
[2 marks]

(c) Year _____

20 The table opposite shows the quarterly unemployment figures for a seaside town.
The four-quarter moving averages are also shown.

The quarterly unemployment figures and the moving averages are plotted on the graph below.



(a) Calculate the last moving average.
Write it in the table and plot it on the graph.
[2 marks]

Year	2006				2007				2008			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Number of people unemployed	6600	4510	1280	3730	7420	4730	2240	4330	7860	4870	2260	4370
Four-quarter moving average			4030	4235	4290	4530	4680	4790	4825	4830	_____	

(b) (i) Use the trend of the moving averages to predict the next moving average.
[1 mark]

(b)(i) _____

(ii) Hence find an estimate for the number of people unemployed in the first quarter of 2009.
Show your working clearly.
[2 marks]

(ii) _____

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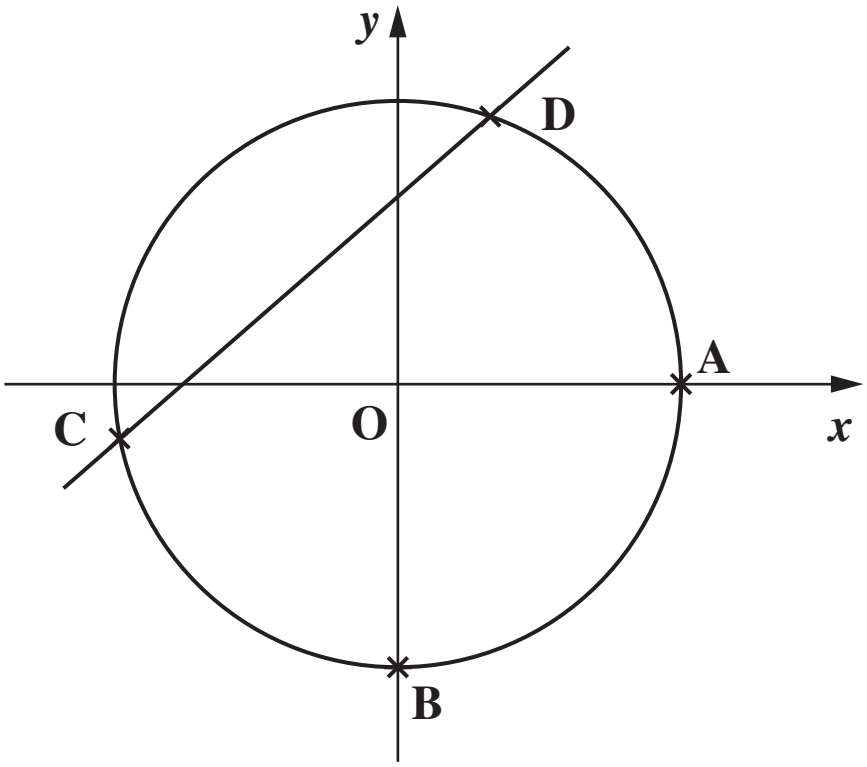
TURN OVER FOR QUESTION 21

21 This is a sketch of the graphs of $x^2 + y^2 = 18$ and $y = x + 3$.



Not to scale

(a) The circle intersects the positive *x*-axis at A and the negative *y*-axis at B.

Find the coordinates of A and B, correct to 1 decimal place.
[2 marks]

(a) A (_____ , _____)

B (_____ , _____)

(b) (i) Show that, where the two graphs intersect,
$2x^2 + 6x - 9 = 0$.
[2 marks]

(ii) The graphs intersect at C and D.

Find the coordinates of C, correct to 1 decimal place.
[3 marks]

(b)(ii) C (_____ , _____)

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