M3

OCR RECOGNISING ACHIEVEMENT

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS C (GRADUATED ASSESSMENT)

B273B

MODULE M3 (SECTION B)

Tuesday 21 June 2011
Afternoon

Duration: 30 minutes

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. 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 4.
- You are expected to use a calculator in Section B of this paper.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

OCR is an exempt Charity

Turn over

Formulae Sheet

Area of trapezium $= \frac{1}{2}(a + b)h$
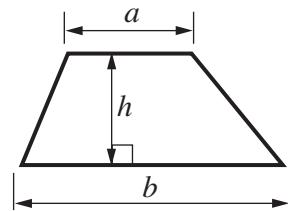
Volume of prism = (area of cross-section) × length
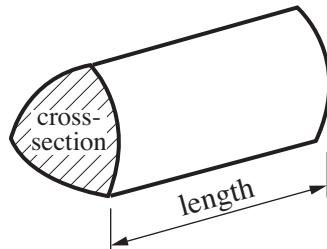
PLEASE DO NOT WRITE ON THIS PAGE

4 (a) This graph converts between speed in metres per second and speed in miles per hour.
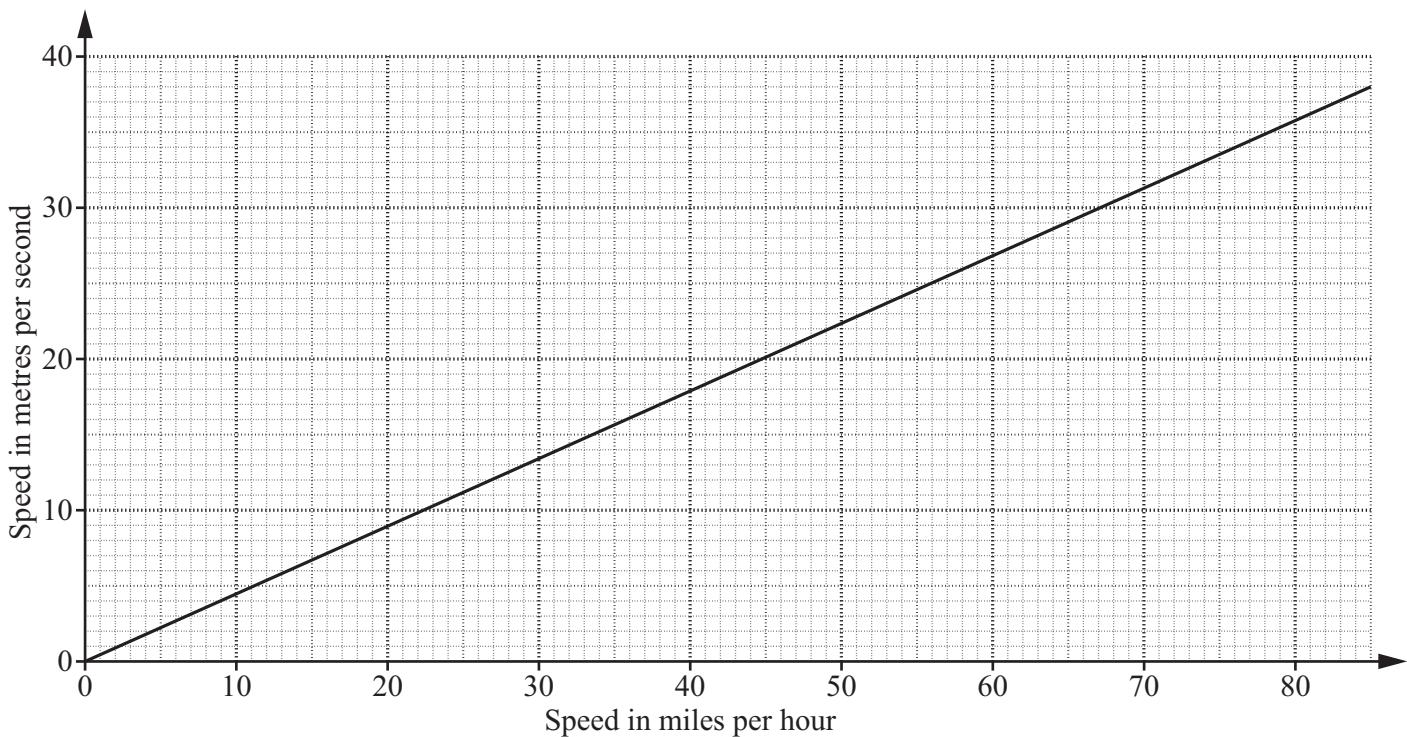
Use the graph to answer these questions.

(i) What is 80 miles per hour in metres per second?

(a)(i) .... metres per second **[1]**

(ii) Which speed is greater, 45 miles per hour or 25 metres per second?
Explain how you decide.

.... because ....

.... **[2]**

(b) Wind speeds are measured in knots.
The Beaufort scale of wind force is also used.

Beaufort Scale	Knots	Description
1	1 to 3	Light air
2	4 to 6	Light breeze
3	7 to 10	Gentle breeze
4	11 to 16	Moderate breeze
5	17 to 21	Fresh breeze
6	22 to 27	Strong breeze
7	28 to 33	Near gale
8	34 to 40	Gale
9	41 to 47	Severe gale
10	48 to 55	Storm
11	56 to 63	Violent storm
12	64 to 71	Hurricane

(i) A wind speed is measured at 50 knots.

What number is this on the Beaufort scale?

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

(ii) This formula converts speed in knots into speed in miles per hour.

$$m = 1 \cdot 15k$$

m is the speed in miles per hour
and k is the speed in knots.

What is the **greatest** wind speed, in **miles per hour**, for a gentle breeze?

(ii) .... miles per hour **[3]**

(c) These figures show the wind speed, in knots, taken every 10 minutes in London during one hour.

2·4   6·2   3·4   7·2   4·8   2·4

(i) Calculate the mean of these wind speeds.

(c)(i) .... knots **[3]**

(ii) What is the range of these wind speeds?

(ii) .... knots **[1]**

(iii) Looking at the six wind speeds Jessica says

Half the results are greater than 4 knots.

Is Jessica right?
Give a reason for your answer.

.... because ....

.... **[1]**

5 Cherrapunjee in India is one of the wettest places on earth.
Each year, on average, the rainfall is 1112 cm.

    (a) A quarter of the rain falls in June.

       Calculate the rainfall in June.

       (a) .... cm **[1]**

    (b) This formula gives the volume of rain.

> Multiply the rainfall in centimetres by 2·2.
>
> The answer is the number of gallons falling on each square metre.

       In a year in Cherrapunjee, how many gallons of rain fall on an area of 12 square metres?

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

6 Solve.

   (a) $2a = 12$

<div align="right">

(a) .... **[1]**

</div>

   (b) $b + 5 = 13$

<div align="right">

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

</div>

   (c) $c \div 2 = 5$

<div align="right">

(c) .... **[1]**

</div>

7 Work out.

   (a) $4 \times (15 + 5)$

<div align="right">

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

</div>

   (b) $\sqrt{12\,321}$

<div align="right">

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

</div>

   (c) the square of 47

<div align="right">

(c) .... **[1]**

</div>

TURN OVER FOR QUESTION 8

8 Amy has to pick one of these five envelopes to win a prize.
She wins the amount of money shown on the envelope.

| £1000 | 1p | 1p | 1p | 1p |
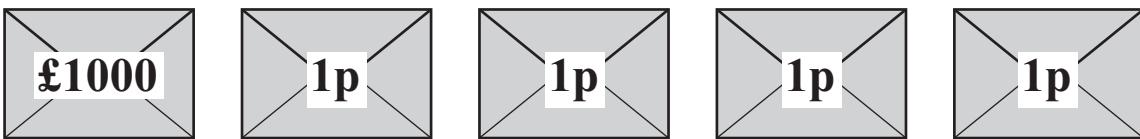
Amy picks one of the envelopes without looking.

(a)

The probability of me winning the £1000 is $\frac{1}{2}$.

Is Amy right or wrong?
Give a reason for your answer.

.... because ....

.... **[1]**

(b) (i) On the scale, draw an arrow showing the probability that Amy wins exactly 1p.
Label your arrow A. **[1]**

(ii) On the scale, draw an arrow showing the probability that Amy wins exactly £5.
Label your arrow B.

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0                        1
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[1]