

GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS C (GRADUATED ASSESSMENT)
MODULE M10 – SECTION A

B280A

Candidates answer on the question paper

OCR Supplied Materials:

None

Other Materials Required:

- Geometrical instruments
- Tracing paper (optional)

Tuesday 23 June 2009
Morning

Duration: 30 minutes



Candidate Forename		Candidate Surname	
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Centre Number							Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- 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.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

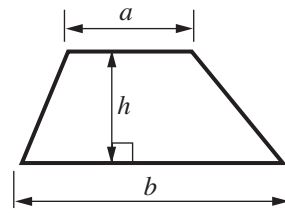
WARNING



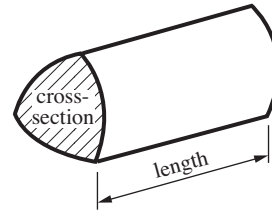
No calculator can be used for Section A of this paper

Formulae Sheet

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



Volume of prism = (area of cross-section) \times length

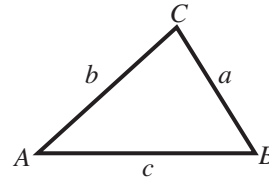


In any triangle ABC

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

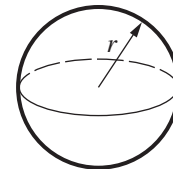
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



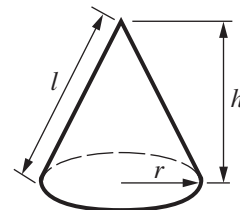
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

Curved surface area of cone = $\pi r l$



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

1 (a) Convert $\frac{2}{15}$ to a decimal.

(a) [2]

(b) Use prime factors to explain why $\frac{1}{80}$ converts to a **terminating** decimal.

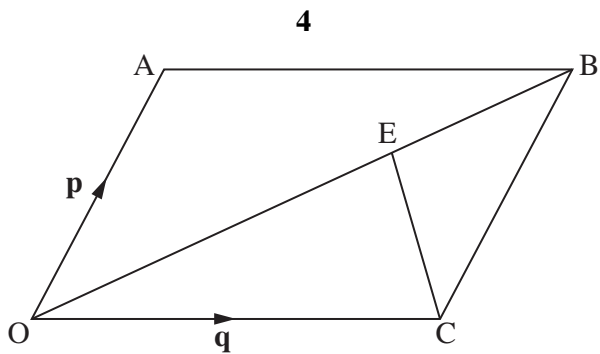
.....
..... [2]

2 A pencil case contains only three blue pens and eight red pens.
Aimee selects one pen at random and **does not** replace it.
She then takes a second pen.

Work out the probability that she takes 2 pens of the same colour.

..... [4]

3



OABC is a parallelogram.

$\vec{OA} = \mathbf{p}$ and $\vec{OC} = \mathbf{q}$.

E lies on OB so that $OE : EB = 2 : 1$.

Find the following vectors in terms of \mathbf{p} and \mathbf{q} .

(a) \vec{OB}

(a) [1]

(b) \vec{OE}

(b) [1]

(c) \vec{CE}

(c) [1]

4 (a) Write $y = x^2 - 6x + 28$ in the form $y = (x - a)^2 + b$.

(a) [3]

(b) Hence state

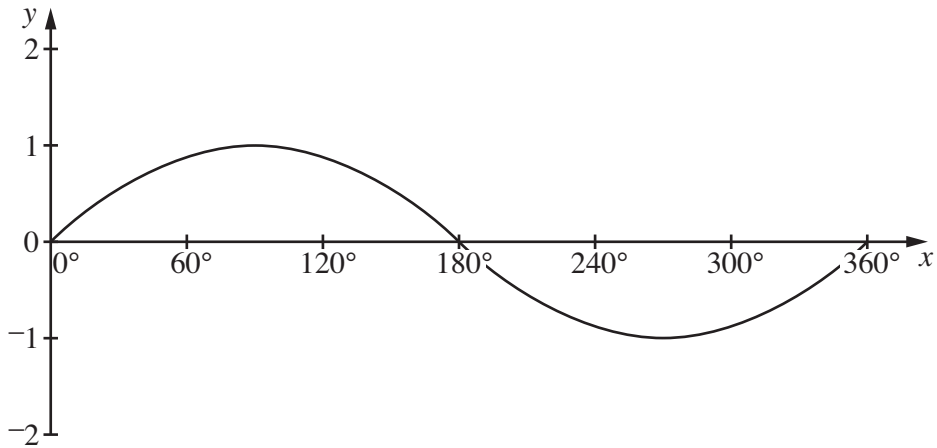
(i) the minimum value of $y = x^2 - 6x + 28$,

(b)(i) [1]

(ii) the equation of the line of symmetry of the graph of $y = x^2 - 6x + 28$.

(ii) [1]

5 (a) The graph of $y = \sin x$ for $0^\circ \leq x \leq 360^\circ$ is drawn below.

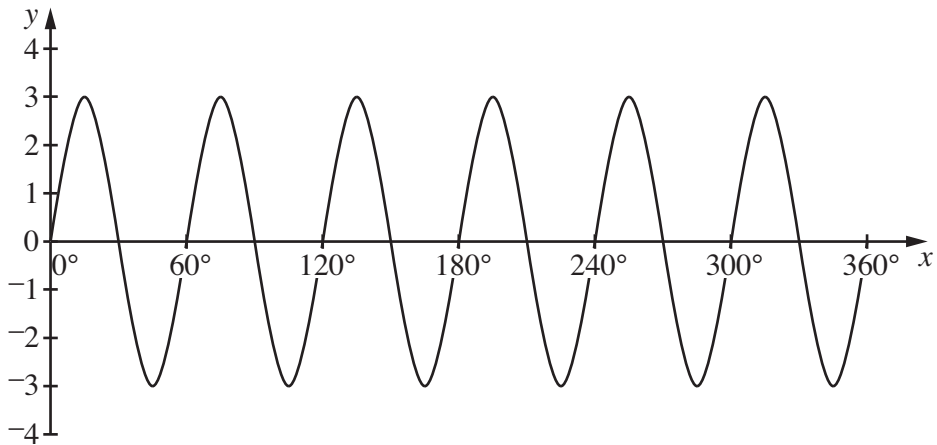


One solution to the equation $\sin x = 0.4$ is $x = 24^\circ$, correct to the nearest degree.

Use this information to solve $\sin x = -0.4$ for $0^\circ \leq x < 360^\circ$.

(a) $^\circ$ and $^\circ$ [2]

(b)



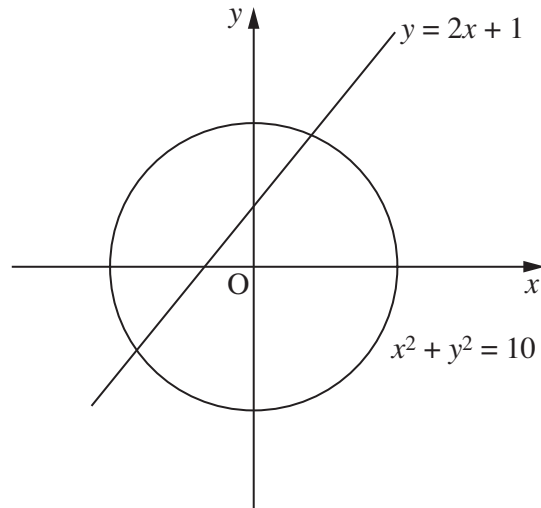
The graph above has an equation of the form $y = 3 \sin kx$.

State the value of k , giving a reason for your answer.

$k = \dots\dots\dots$ because
 [1]

6

7



Not to scale

The sketch shows a circle with equation $x^2 + y^2 = 10$ and a straight line with equation $y = 2x + 1$.

- (a) Show that the values of x at the points of intersection of the circle and the line satisfy the equation $5x^2 + 4x - 9 = 0$.

[3]

- (b) By solving the equation $5x^2 + 4x - 9 = 0$, find the values of x at these points of intersection.

(b) [3]

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