WJEC CBAC

GCSE

4352/02

MATHEMATICS (UNITISED SCHEME)
UNIT 2: NON-CALCULATOR MATHEMATICS
HIGHER TIER

A.M. MONDAY, 16 January 2012

$1\frac{1}{4}$ hours

**CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER**

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **6**.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**5**	
2	**2**	
3	**8**	
4	**3**	
5	**5**	
6	**5**	
7	**7**	
8	**6**	
9	**11**	
10	**4**	
11	**5**	
12	**4**	
TOTAL MARK		

Formula List

Area of trapezium = $\frac{1}{2}(a + b)h$
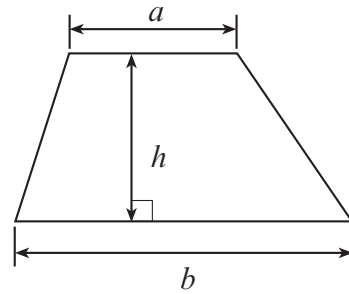
Volume of prism = area of cross-section × length
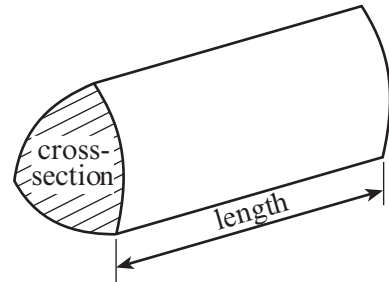
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$
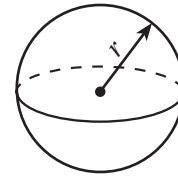
Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$
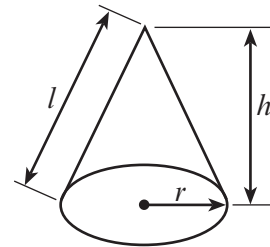
In any triangle ABC

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 = $\frac{1}{2}ab \sin C$
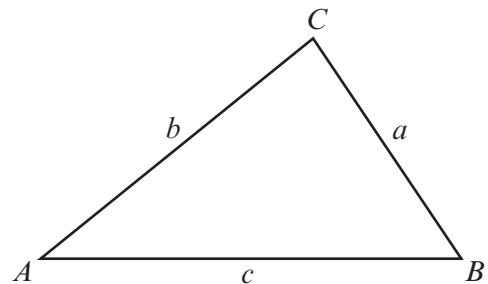
The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

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

1. *(a)* The diagram shows three parallel paths with a cycle track connecting them.
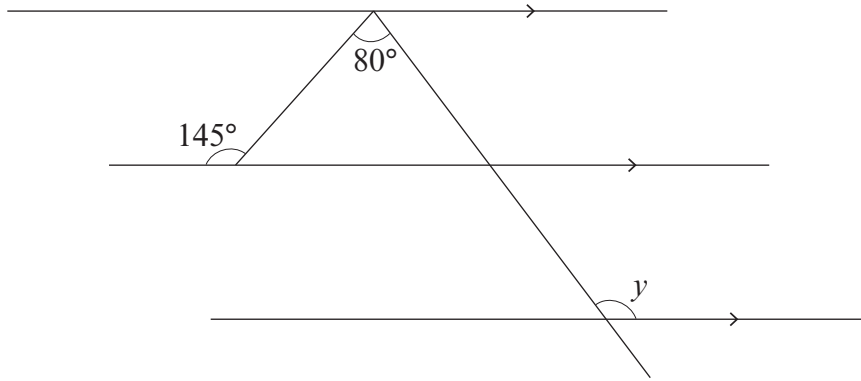
Diagram not drawn to scale

Calculate the size of the angle marked *y*.

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$$y = \text{................}°$$

[2]

(b)
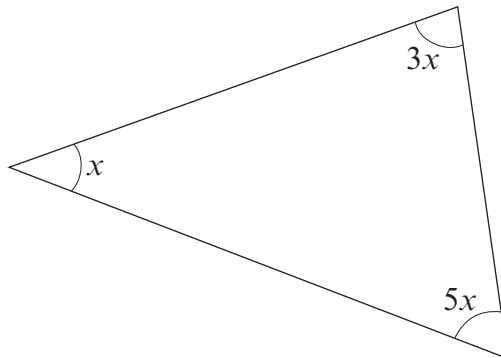
Diagram not drawn to scale

Calculate the size of each of the angles in the triangle.

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[3]

Turn over.

2. Rotate the rectangle through 90° clockwise about the point (1, 4).

[2]
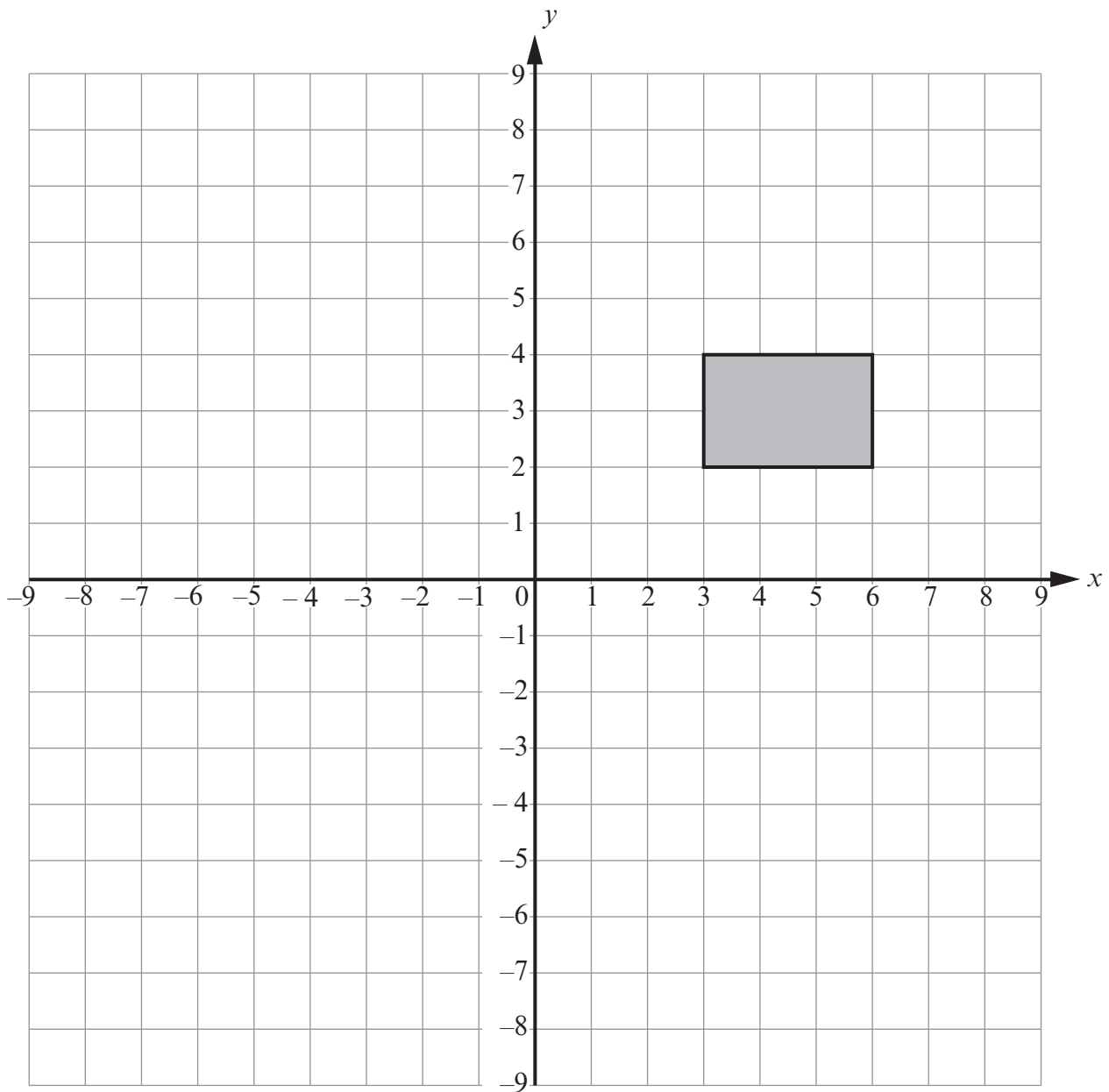
3. *(a)* Show that $7{\cdot}02^2 - 3{\cdot}9^2$ is approximately 33.

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[2]

(b) Calculate $6\frac{1}{4}\%$ of £40.

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[3]

(c) Write down the reciprocal of 2·5.

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[2]

(d) Simplify $2xy + 3y - 13xy + 4x - 17y$.

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[1]

Turn over.

4. Two fair coins are thrown.
Ahmed says,
   "the probability of obtaining two tails is less than 0·5."
Is Ahmed correct?
You must show **all** the working necessary to justify your answer.

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[3]

5. *(a)* Simplify $4(x + 5) - 3(2x - 4)$.

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[2]

(b) Simplify $\dfrac{y^{16} \times y^2}{y^4}$.

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[1]

(c) Solve $3b + 2 > 29$.

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6. *You will be assessed on the quality of your written communication in this question.*

Explain why the sum of the interior angles of any quadrilateral is always 360°.

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[5]

Turn over.

7. *(a)* (i) Use the graph paper below to draw the graph of $3x + 2y = 12$.

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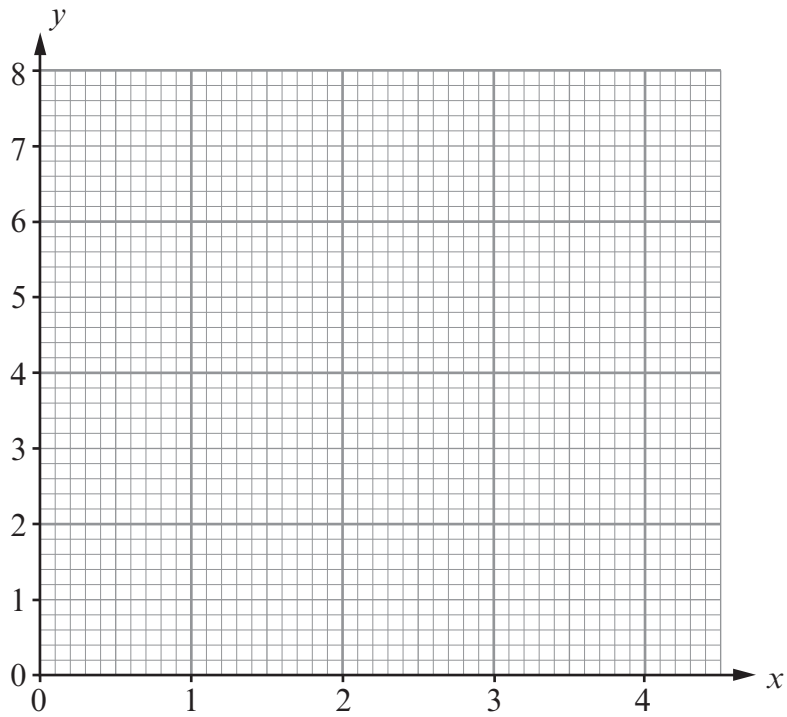
(ii) Write down the gradient of $3x + 2y = 12$.

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[1]

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(b) Select from the following list of equations to complete the table below.

Equations:

A: $y + 4x = 3$ **B:** $y = 5x$ **C:** $y = 5x + 7$

D: $y - 3x = 4$ **E:** $x + y - 5 = 0$ **F:** $2y = 3x + 5$

Description	Equation
Passes through the origin (0, 0)	
Parallel to $y = 3x + 7$	
Intersects the *y*-axis at $y = 5$	

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[3]

Turn over.

8. *(a)* In 2004 there were 7 000 000 people living alone in Great Britain, this is four times as many as in 1961.
Calculate how many people lived alone in Great Britain in 1961.
Express your answer in standard form.

[3]

(b) Two thirds of the 24·6 million households in the UK in 2004 were family households.
How many households in the UK in 2004 were family households?
Express your answer correct to two significant figures.

[3]

9. *(a)* Expand and simplify $(2x + 3)(3x - 5)$.

[3]

(b) Solve the following simultaneous equations.

$$5x + 2y = 5$$
$$7x + 3y = 9$$

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(c) Make *t* the subject of the formula $3t = d(5 - t)$.

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[4]

Turn over.

10. The points *A, B, C* and *D* lie on the circumference of the circle with centre *O*.
$B\hat{C}D = x$, where *x* is measured in degrees.
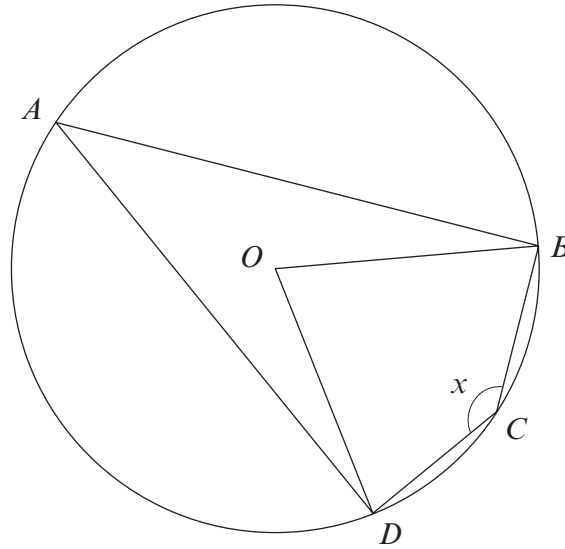
Diagram not drawn to scale

Show, giving reasons in your answer, that the size of $D\hat{O}B$ in degrees is 360 – 2*x*.

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11. *(a)* Express $0 \cdot 03\dot{4}$ as a fraction.

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(b) Simplify $(3\sqrt{5} - \sqrt{2})(3\sqrt{5} + \sqrt{2})$ and state whether your answer is rational or irrational.

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[3]

Turn over.

12. A box contains 20 marbles, of which 2 are red, 3 are yellow and 15 are black.
Two marbles are selected at random, without replacement, from the box.
What is the probability that exactly one of the marbles is black?

[4]

Question number	Additional page, if required. Write the question number(s) in the left-hand margin	Examiner only