WJEC CBAC

GCSE

4352/02

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A14-4352-02

MATHEMATICS (UNITISED SCHEME)
UNIT 2: Non-Calculator Mathematics
HIGHER TIER

A.M. FRIDAY, 7 November 2014

1 hour 15 minutes

CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	2	
2.	7	
3.	2	
4.	3	
5.	5	
6.	6	
7.	5	
8.	5	
9.	4	
10.	3	
11.	6	
12.	3	
13.	6	
14.	6	
15.	2	
Total	65	

ADDITIONAL MATERIALS

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

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.

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 **2**.

Formula List

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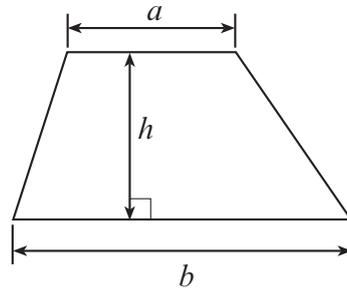
Volume of prism = area of cross-section × length
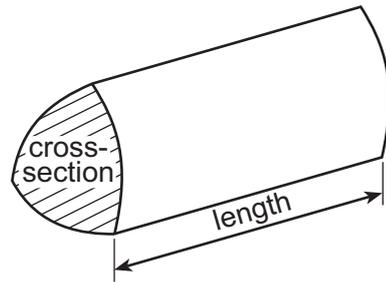
Volume of sphere $= \dfrac{4}{3}\pi r^3$

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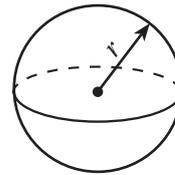
Volume of cone $= \dfrac{1}{3}\pi r^2 h$

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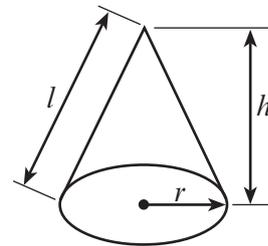
In any triangle ABC

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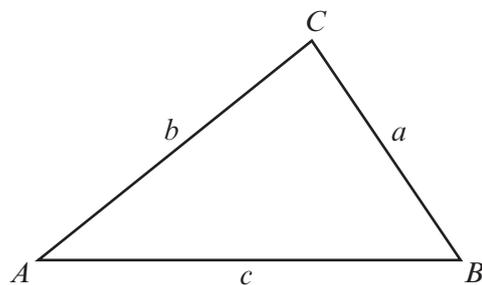
The Quadratic Equation

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

where $a \neq 0$ are given by

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

1. Reflect the given triangle in the line $y = 3$. [2]

Turn over.
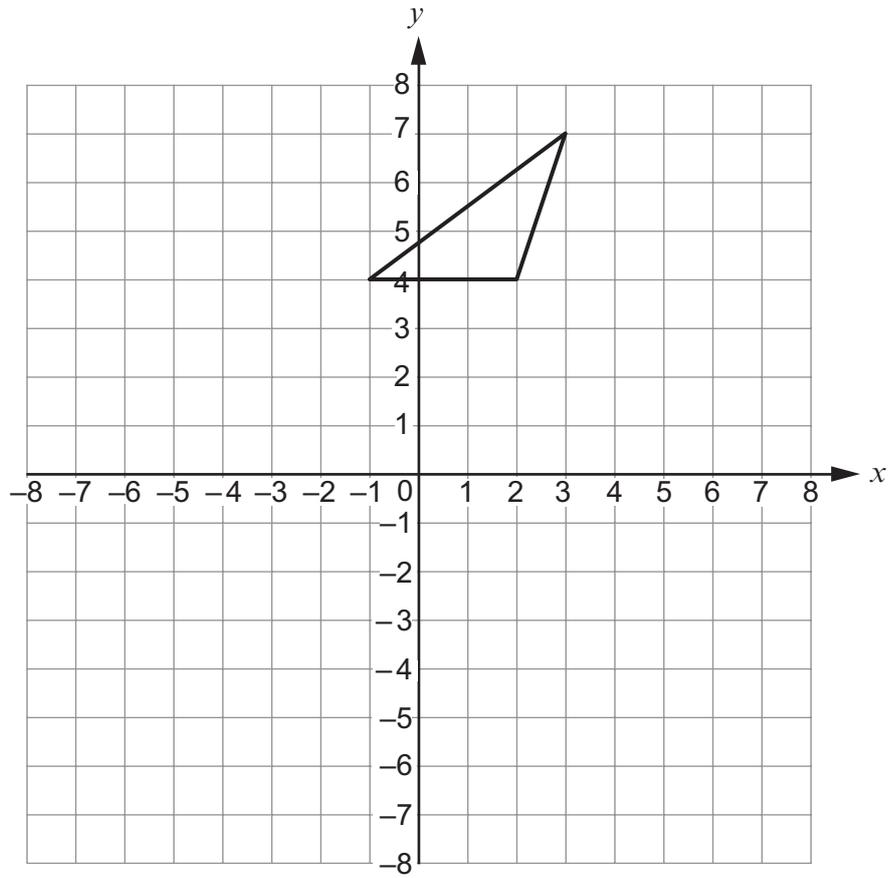
2. *You will be assessed on the quality of your written communication in this question.*
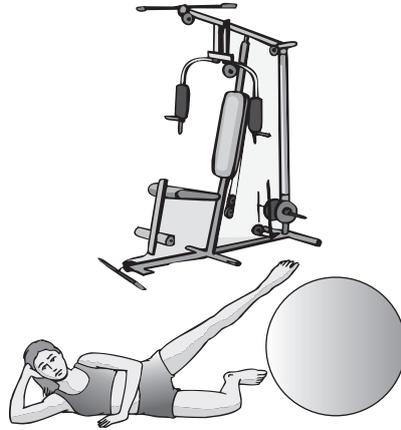
Sadie wants to join a fitness club for one year.
Two types of membership are available.

Basic Membership	**Elite Membership**
£32 per month	£60 per month
Special offer: Pay for 10 months in a single payment and get membership for a whole year	Special offer: 10% off when you pay for a whole year in a single payment
Exercise class: £4 per class	All classes included

Sadie wants to take part in two exercise classes per week for the 52 weeks of the year.

Sadie decides to pay for a whole year's membership in a single payment.
Which type of membership is cheaper?
By how much is it cheaper?
You must show **all** your working.

[7]

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(4352-02)

Turn over.

3. Find the size of each of the angles x and y in the diagram below. [2]

Diagram not drawn to scale

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$x = $ .... ° $y = $ .... °

4.

DOG FOOD

$\frac{1}{2}$ kg tin for £1.70

1 kg tin for £3.30

2 kg tin for £5.20

Alun is looking after 6 large dogs for one day.

They each need $\frac{3}{4}$ kg of tinned dog food every day.

Alun needs to buy food for them and wants to spend as little as possible.

How much will he need to spend on dog food for the day?

You must show **all** your working. [3]

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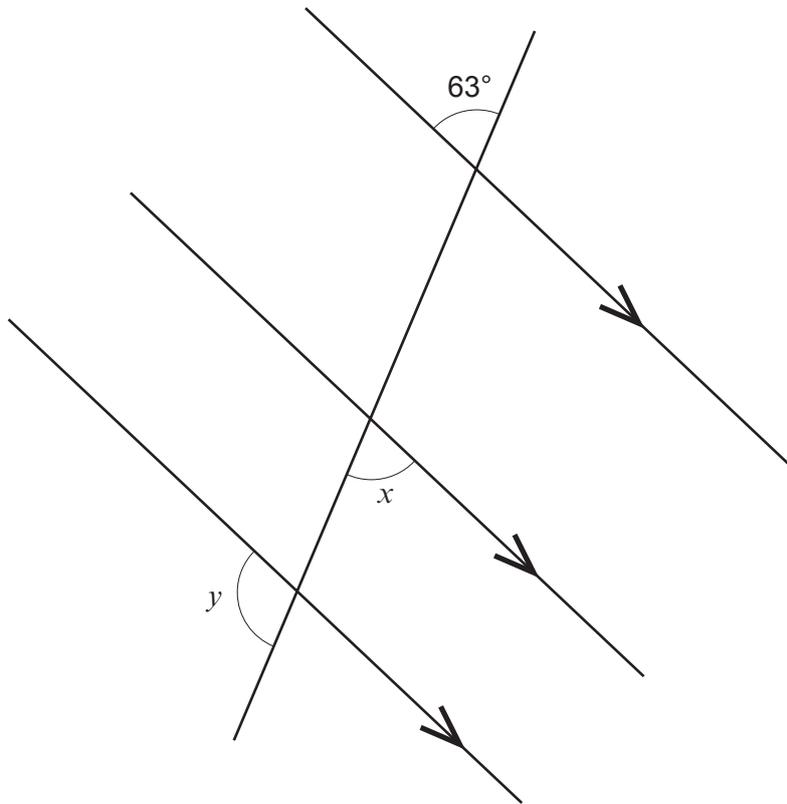
5. All the angles in the following quadrilateral are measured in degrees. Find the size of the largest angle.

[5]

$5x - 10$

$4x + 12$

$x + 18$
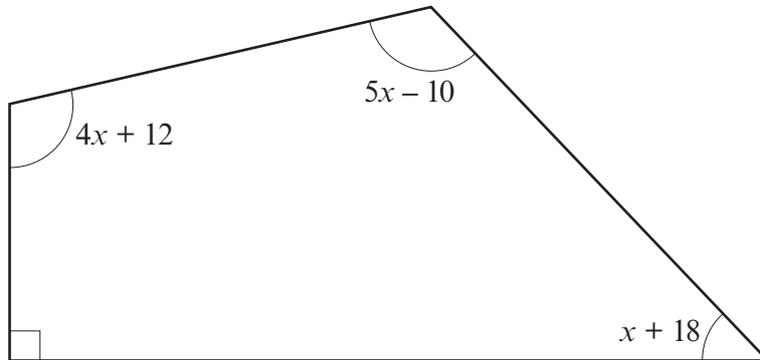
Diagram not drawn to scale

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6. *(a)* (i) Solve the inequality. [2]

$$6p < 4p - 7$$

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(ii) An integer p satisfies the above inequality.
Write down the greatest possible value of p. [1]

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(b) Simplify $5(3x + 2) - 4(2x - 5)$. [2]

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(c) Write down the value of the reciprocal of 0·01. [1]

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7. A children's game uses a circular spinner, which is coloured black and white. A diagram of the spinner is shown below.
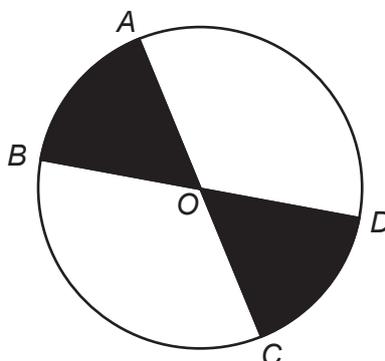
Diagram not drawn to scale

AC and *BD* are diameters of the circle. $A\widehat{O}B = 54°$.

(a) Find the probability that the spinner lands on a **black** sector. [2]

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(b) The spinner is spun 720 times. How many times would you expect the spinner to land on a **white** sector? [3]

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8. *(a)* Write down an expression for the nth term of the following sequence. [2]

$$5, 12, 19, 26, 33, \ldots\ldots\ldots$$

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nth term ....

(b) The following patterns are made using small squares.
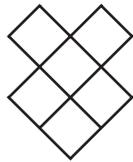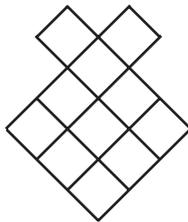
Pattern 1   Pattern 2   Pattern 3
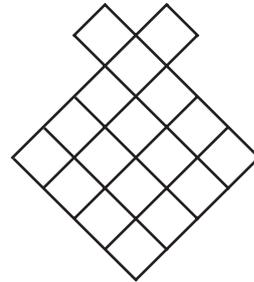
Find the number of small squares in pattern n. [3]

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9. Solve the following simultaneous equations using an algebraic method.
You must show all your working. [4]

$$6x - 3y = 21$$
$$4x + 5y = 7$$

10. A giant crane on a construction site can carry a maximum load of $1{\cdot}32 \times 10^6$ kg.
The crane is required to lift concrete blocks, each weighing 400 kg.
What is the greatest number of concrete blocks that the crane can lift each time?
Give your answer in standard form. [3]

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11. *(a)* Expand and simplify $(2x + y)(5x - 2y)$. [2]

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(b) Solve the following equation. [4]

$$\frac{2x - 1}{3} + \frac{1}{2} = \frac{x - 5}{6}$$

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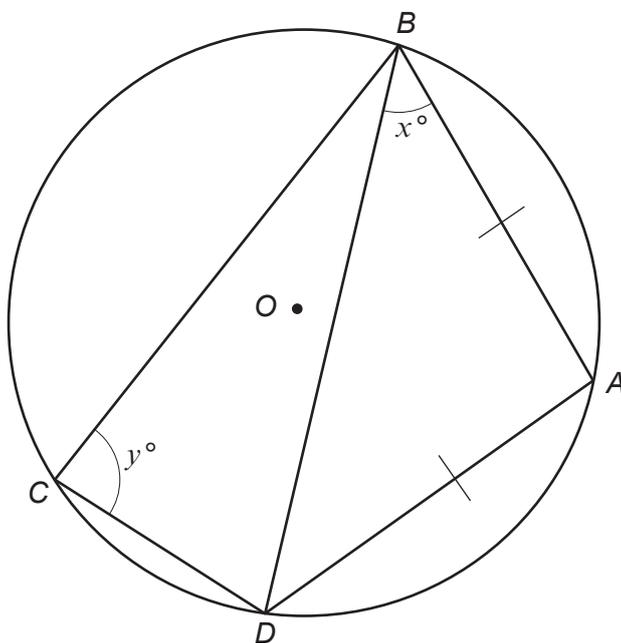
12. The points *A*, *B*, *C* and *D* lie on the circumference of a circle, centre *O*, and *AB = AD*.

Diagram not drawn to scale

Prove that $y = 2x$.
You must include written reasons in your answer. [3]

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13. *(a)* Evaluate $4^0 + \left(\dfrac{1}{25}\right)^{-\frac{1}{2}}$. [3]

(b) Evaluate $\left(\sqrt{32} - \sqrt{2}\right)^2$ and state whether your answer is rational or irrational. [3]

14. A box contains 5 red balls, 1 green ball and 6 pink balls.
Two balls are to be picked at random, without replacement.

(a) Find the probability of picking 1 red ball and 1 green ball. [3]

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(b) Find the probability of picking at least one red ball. [3]

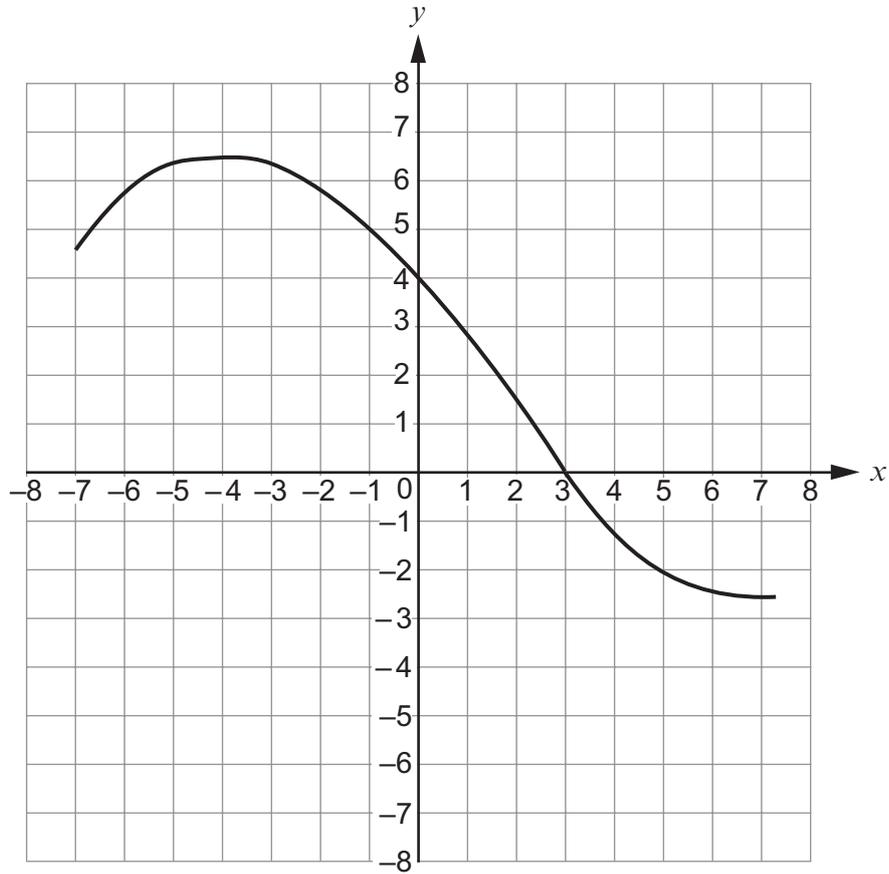...

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(4352-02) **Turn over.**

15. The graph below shows a sketch of the curve $y = f(x)$.
On the same diagram, sketch the curve $y = f(-x)$.
You must show clearly where the curve crosses each axis.

[2]

END OF PAPER

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