Surname		Centre Number	Candidate Number
Other Names			0

WJEC CBAC

New GCSE

4351/02

MATHEMATICS (UNITISED SCHEME)
UNIT 1: MATHEMATICS IN EVERYDAY LIFE
HIGHER TIER

A.M. MONDAY, 14 November 2011

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

ADDITIONAL MATERIAL

A calculator will be required for this paper.

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 or use the π button on your calculator.

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 **4**.

Formula List

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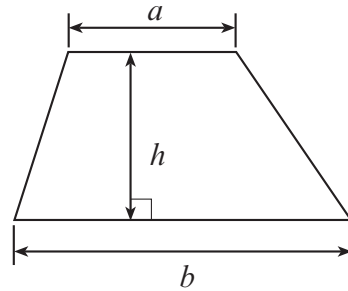
Volume of prism = area of cross-section × length
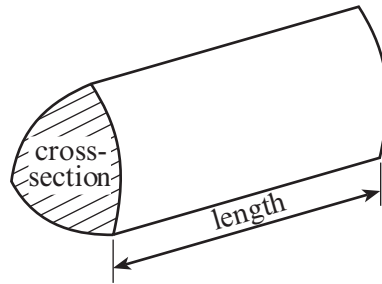
Volume of sphere $= \frac{4}{3}\pi r^3$

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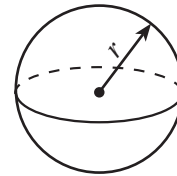
Volume of cone $= \frac{1}{3}\pi r^2 h$

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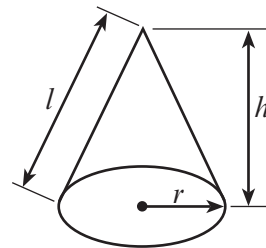
In any triangle ABC

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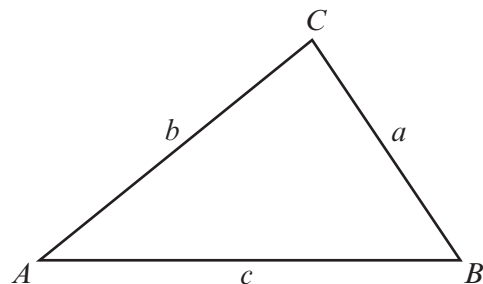
The Quadratic Equation

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

where $a \neq 0$ are given by

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

1. Before a sale, a store sells a shirt for £24 plus VAT at 20%.
During the sale the store reduces the price you have to pay for the shirt by one quarter.

How much will you have to pay for the shirt in the sale?

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[4]

Turn over.

2. The number of seats won by the political parties in the May 2010 general election is shown in the table below.

Political Party	Number of seats
Conservative	306
Labour	258
Liberal Democrats	57
Others	29

Draw a pie chart, as accurately as possible, to show this information.
Show how you calculate the angles of your pie chart.

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[4]
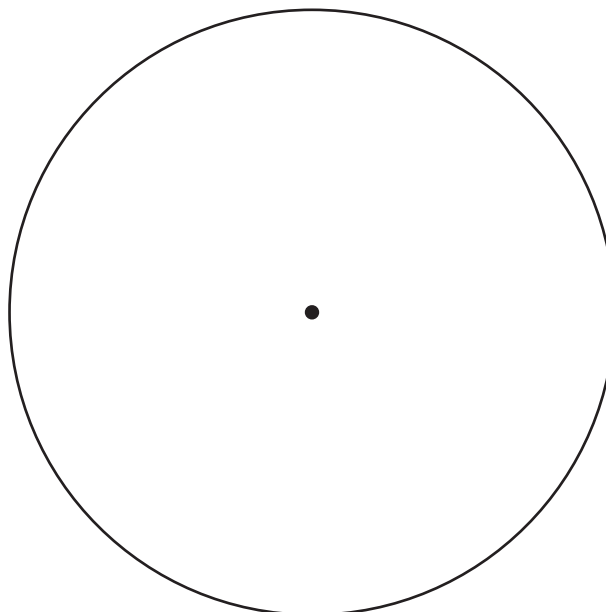
3. The Headteacher of a school wants to test the following hypothesis.

'Most pupils spend less than one hour per night doing their homework.'

She plans to

- hand out a short questionnaire to a Year 10 Geography class,

- ask the following questions,

  (i)   What is your name and your tutor group?

  (ii) How much time do you spend on your homework?

- collect the replies in two weeks' time.

Write down **three** unfavourable comments about this plan.

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2. ....

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[3]

Turn over.

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

Marlon went to New Zealand on holiday.

After he arrived he exchanged £800 for New Zealand dollars.

He spent 1391 dollars in New Zealand.

At the end of his visit he changed the dollars he had left over into as many 10 dollar notes as possible.
He kept these 10 dollar notes.
He placed the rest of the money in a charity box at the airport.

On his return to the U.K. he changed the 10 dollar notes into pounds (£).

The exchange rate for buying dollars when he arrived in New Zealand was £1 = 2.08 dollars.

The exchange rate for selling dollars when he returned to the U.K. was £1 = 2.25 dollars.

How many pounds did he receive on his return?

[7]

5. A group of students sat four separate tests, Test A, Test B, Test C and Test D, as part of their course.

Using the data from the marks scored in each of these tests the following sketch graphs were drawn. The same scales are used in each graph.
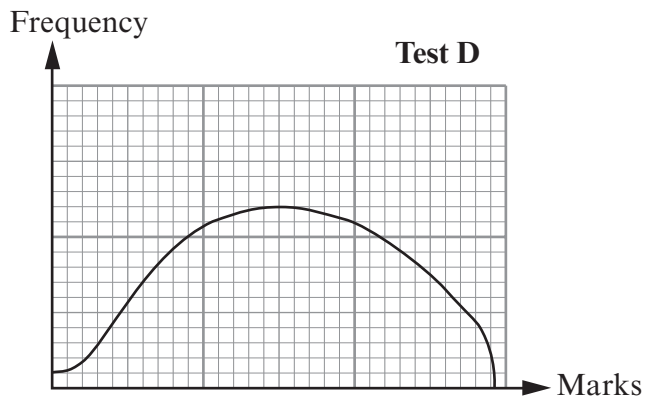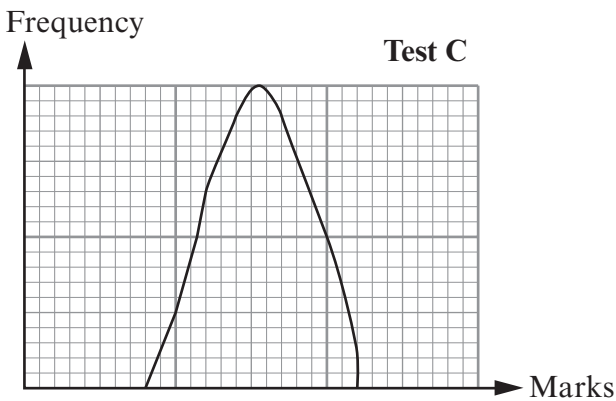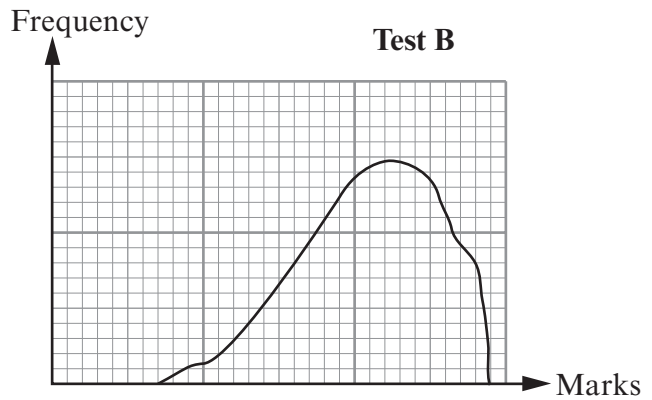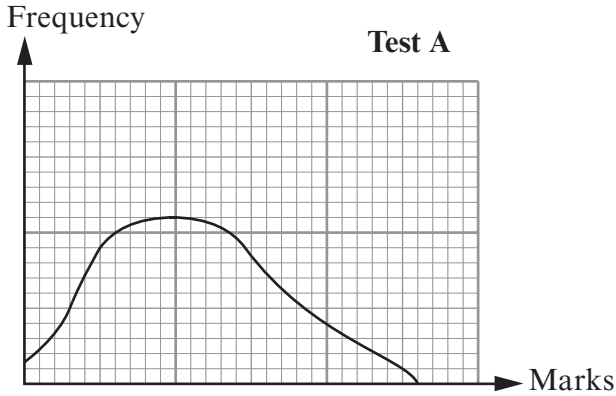
Complete the following statements.

"Most of the students gained high marks in Test ...."

"The range of students' marks was smallest in Test ...."

"Most of the marks were low in Test ...."

[3]

Turn over.

6. As part of her training, an athlete runs for 5 minutes and then walks for 1 minute.
She repeats this without stopping for a period of one hour.

Her average running speed is 18 km per hour.
Her average walking speed is 6 km per hour.

Calculate how many kilometres she will complete during the hour.

[6]

7. Idris has been awarded a salary increase from £23 500 per annum to £23 970 per annum.

By what percentage has his salary increased?

[3]

8. Points *A* and *B* in a park are connected by a straight path and also a semicircular path as shown below.
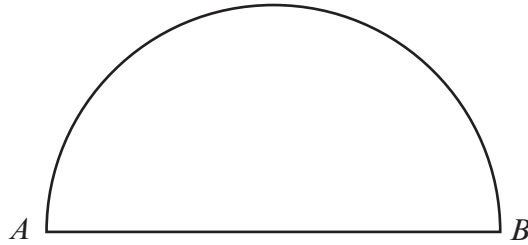
Diagram not drawn to scale

The radius of the semicircular path is 50 metres.

Clive walks from point *A* to point *B* along the semicircular path and then returns to point *A* along the straight path.

Calculate the total distance that Clive walked, giving your answer to the nearest 10 metres.

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[4]

Turn over.

9. A workforce of 15 people produces, on average, 800 hand-made scarves in 6 days.

(a) How many people, working at the same rate, would be required to produce 1200 of these hand-made scarves in 5 days?

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(b) Each worker is expected to produce 10 of these scarves each day.
Showing your calculations, decide whether or not each person, on average, makes more than 10 scarves per day.

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[1]

10. A motorist is told that his car has been recorded travelling 60 metres in 4 seconds.

The speed limit for the road he was travelling on is 50 km per hour.

(a) At what average speed was he travelling, measured in kilometres per hour?

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[3]

(b) The distance he travelled was recorded accurately but the time was only recorded correct to the nearest second.

Show how the motorist could argue that he was travelling at a speed below the speed limit.

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[3]

Turn over.

11. The weight of fruit collected from an orchard decreases by 8% each year.

This year, 2116 kg of fruit was collected.

What weight of fruit was collected one year ago?

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[3]

12. Twenty five rectangular cards, each measuring 10 cm by 5 cm, are laid on a table in a straight line as shown below.

Diagram not drawn to scale

They are laid in such a way that the 2nd card overlaps the 1st, the 3rd overlaps the 2nd and so on, with the 25th card overlapping the 24th card.

Each card overlaps the previous one by 2 cm ± 0·1 cm.

Calculate the least length and the greatest length of the line of cards.

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13. Calculate the area of the shaded part of the circle, centre O, shown below.
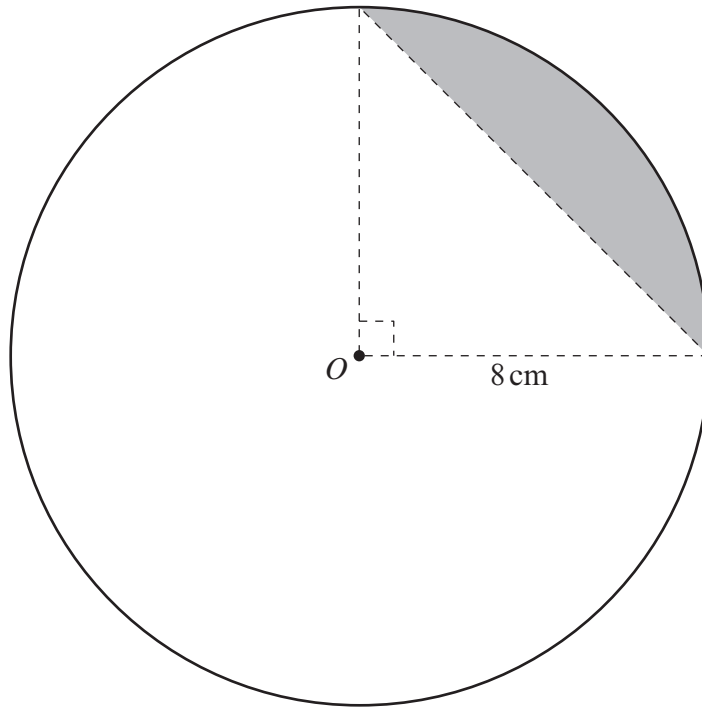
Diagram not drawn to scale

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[3]

Turn over.

14. A metalwork factory has been given an order to produce 50 000 solid metal units of the shape
and size shown below.

9 cm

24 cm
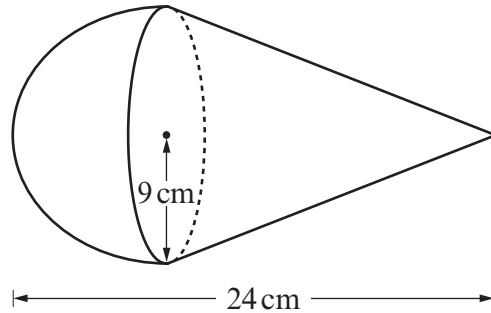
Diagram not drawn to scale

In order to obtain enough metal for the order, the factory melts down a number of other solid
metal units to recycle them.
These units are all identical and their shape and size are shown below.

120 cm

45 cm

45 cm

30 cm

60 cm

60 cm

Diagram not drawn to scale

What is the minimum number of these units that must be melted down to provide enough metal to produce the 50 000 units on order?

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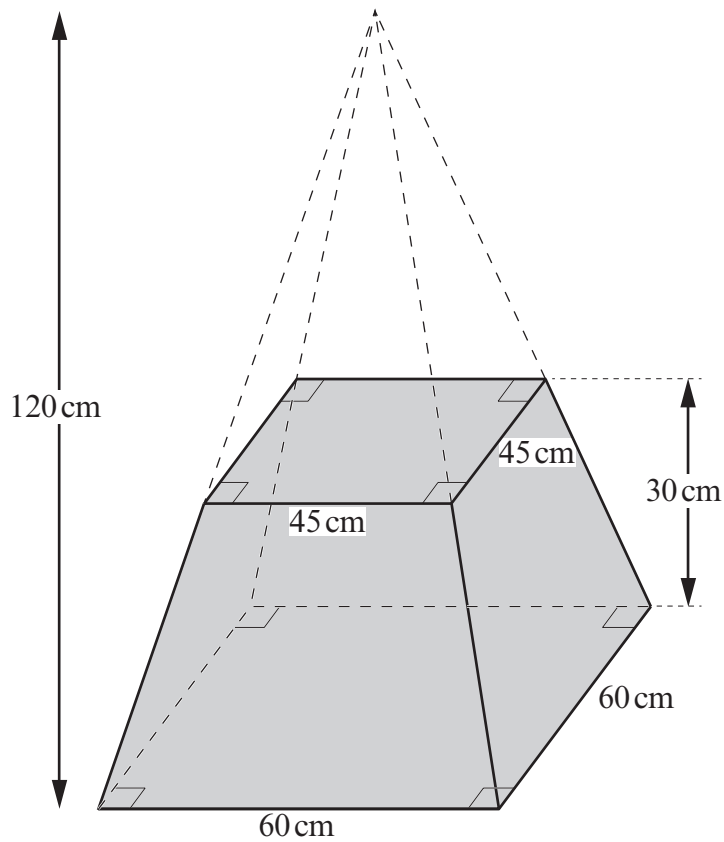
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