Centre Number

Candidate Number

cea

Rewarding Learning

**General Certificate of Secondary Education
2011**

Mathematics

Module N6 Paper 2
(With calculator)
Higher Tier

GMN62

[GMN62]

MONDAY 6 JUNE

3.00 pm – 4.15 pm

TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all fifteen** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 56.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses, set-square and protractor.
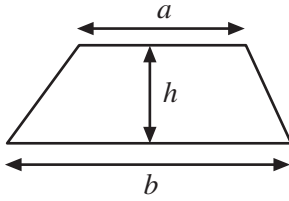The Formula Sheet is on page 2.
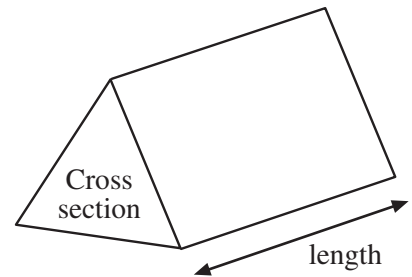
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Examiner Number

Formula Sheet

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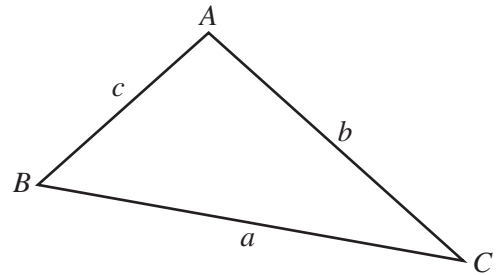

Volume of prism = area of cross section × length

In any triangle *ABC*

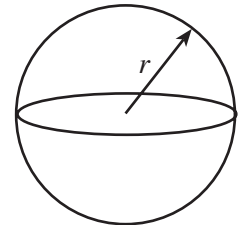**Area of triangle** $= \frac{1}{2}ab\sin C$

Sine rule : $\quad \dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

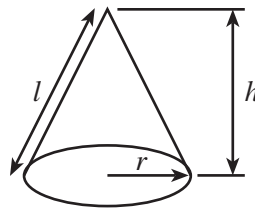**Cosine rule:** $\quad a^2 = b^2 + c^2 - 2bc\cos A$

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 $= \pi r l$

Quadratic equation:

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

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

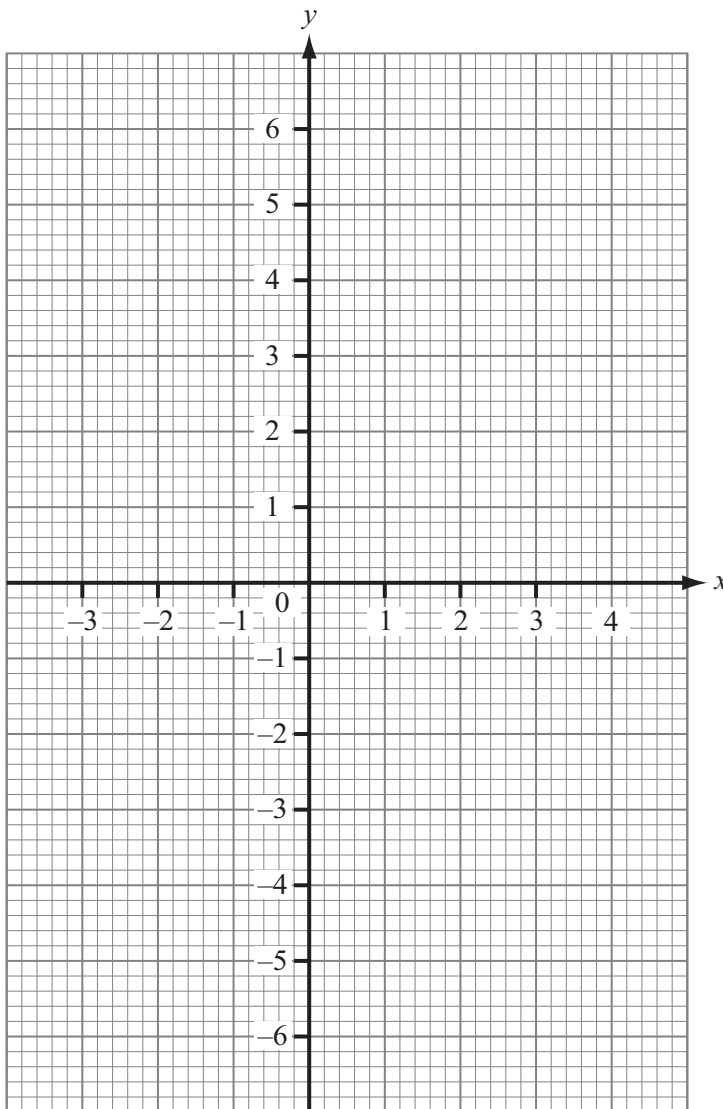**1** A hotel provides lunch for 120 people.
They make 288 sandwiches and 192 tray bakes.

How many sandwiches and tray bakes would they need to provide a similar lunch for 150 people?

Answer _____ sandwiches

_____ tray bakes [2]

[Turn over

2 **(a)** Complete the table below for the curve $y = x^2 + x$

x	-3	-2	-1	0	1	2
y	6		0	0	2	6

[1]

(b) Hence draw the graph of $y = x^2 + x$ on the graph paper. [2]

Total Question 2

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3 The table below shows the amounts of money pupils spent in the school tuck shop one Monday. The probabilities for some of the amounts are given.

Amount, m (£)	$0<m\leq1$	$1<m\leq2$	$2<m\leq3$	$3<m\leq4$	$4<m\leq5$	$m>5$
Probability	0.25	0.35		0.15	0.05	0

(a) What is the missing probability?

Answer _____ [2]

(b) What is the probability that a pupil spent more than £3?

Answer _____ [2]

(c) The following Monday, 200 pupils spent money in the tuck shop. How many would you expect to have spent more than £4?

Answer _____ [2]

(d) What is the probability that a pupil spent more than £4 or not more than £1?

Answer _____ [2]

Total Question 3

[Turn over

4 To calculate the amount of income tax on his earnings, Tom used the following information.

Total earnings = £24,265
Tax free personal allowance = £5,895
10% tax on first £3,200 of taxable income
28% tax on taxable income from £3,201 to £42,600

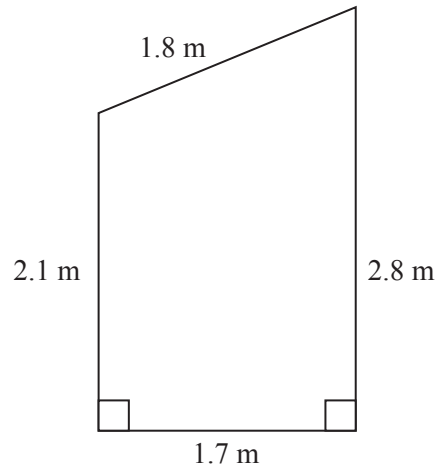What amount of income tax should he have calculated?

Answer £ _____ [4]

Total Question 4

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5 **(a)**

1.8 m

2.1 m   2.8 m

1.7 m

The diagram represents the side view of a garden shed with a sloping roof.
Calculate the area of the side view of the shed.
Give your answer to an appropriate degree of accuracy.

Answer _____ m^2 [3]

(b) The base for a statue is a prism with a cross-section whose area
is 1.23 m^2.
The base is 1 metre in height and weighs 2268 kg.
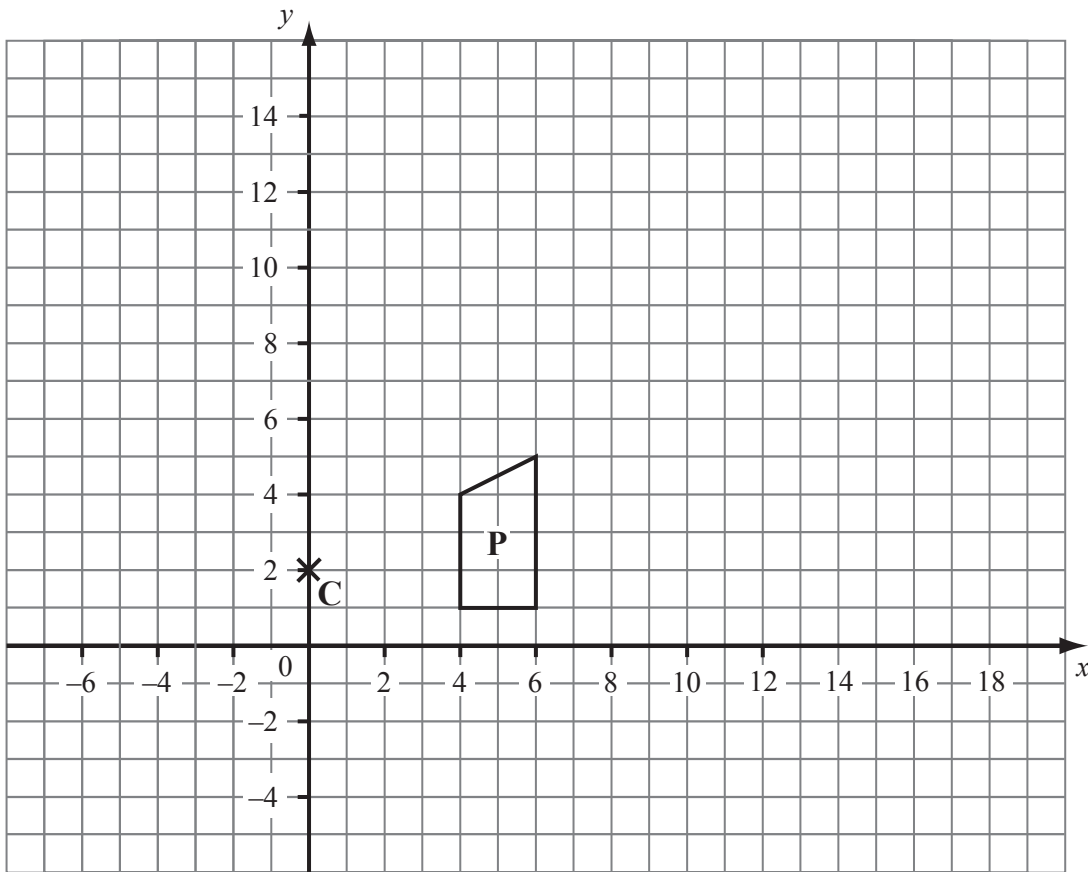Calculate the density of the prism.

Answer _____ kg/m^3 [3]

Total Question 5

[Turn over

6

Shape P is shown on the grid.

(a) Draw the image of shape P under a translation $\begin{pmatrix} -3 \\ 5 \end{pmatrix}$. [2]

(b) Enlarge shape P by a scale factor of 3 using the point C as the centre of enlargement. [3]

Total Question 6

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7 Solve $-7 < 3n - 1 \leq 8$ **where n is an integer**.

Answer _____ [3]

Total Question 7

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8 110 pupils audition for the school musical. 80 are girls.
The probability that a girl succeeds in getting a part is 0.45 and the
probability that a boy succeeds is 0.7

How many pupils are in the school musical?

Answer _____ [4]

Total Question 8

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9 Find, in standard form, the value of

$(3.58 \times 10^{-2}) \times (7.82 \times 10^{-3})$

Answer _____ [2]

Total Question 9

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[Turn over

10 (a) Prove that $(n + 2)(n - 3) \equiv (n - 2)(n + 1) - 4$

Marks	Remark

[2]

(b) Rearrange the formula $W = \dfrac{\sqrt{X}}{Y}$

to make X the subject.

Answer X = _____ [2]

Total Question 10

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11 Find the radius of a sphere which has a surface area of 1000 cm².

Total Question 11

Answer _____ cm [2]

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12 Simplify $\sqrt{x} \times \sqrt{x^3}$

Answer _____[2]

Total Question 12

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13 A magnet is at a distance, *d* cm from a metal object.
The force, *F* newtons, exerted by the magnet on the metal object is
inversely proportional to the square of the distance *d*.
When $d = 5, F = 8$
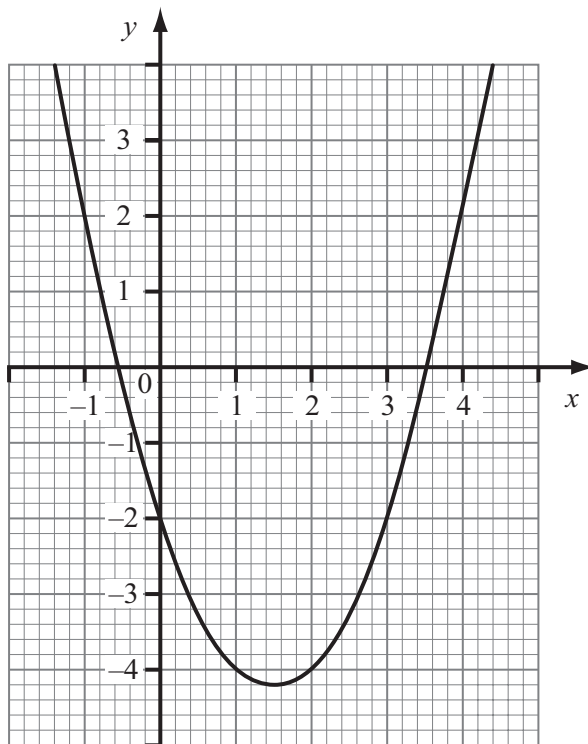
(a) Express *F* in terms of *d*.

Answer _____[3]

(b) Explain what happens to *F* when *d* is doubled.

Answer _____[1]

Total Question 13

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[Turn over

14 The grid shows the graph of $y = x^2 - 3x - 2$

By drawing an appropriate straight line, solve the equation $x^2 - 4x + 1 = 0$

Answer $x =$ _____ [3]

Total Question 14

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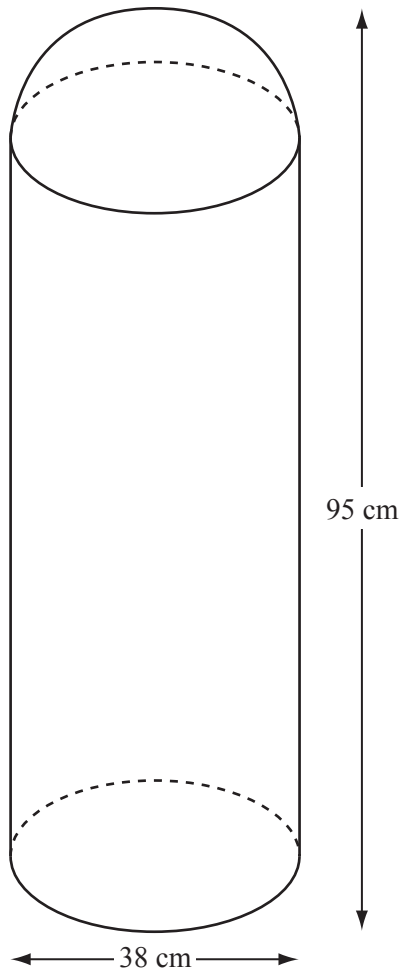
15

95 cm

38 cm

The diagram shows a gas tank.
The tank is a hollow cylinder joined to a hollow hemisphere at the top.
The tank has a circular base.
Both the cylinder and the hemisphere have a diameter of 38 cm.
The height of the tank is 95 cm.
Work out the volume of the tank.

Answer _____ cm³ [4]

Examiner Only	
Marks	**Remark**

Total Question 15

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