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Rewarding Learning

General Certificate of Secondary Education
2011
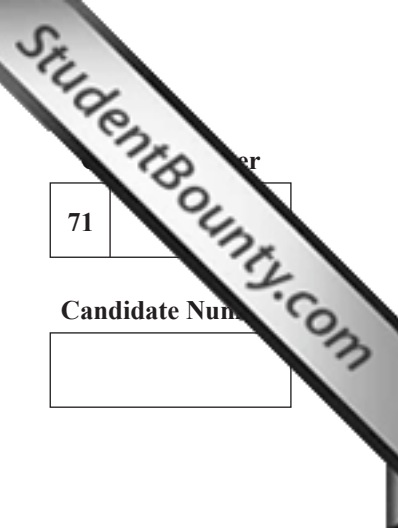
Mathematics

Module N3 Paper 2
(With calculator)
Higher Tier

[GMN32]

TUESDAY 31 MAY

10.30 am–11.30 am

GMN32

TIME

1 hour.

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 twelve** 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 44.
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.
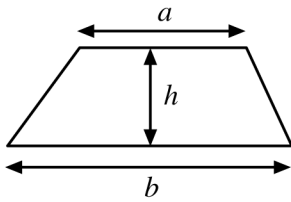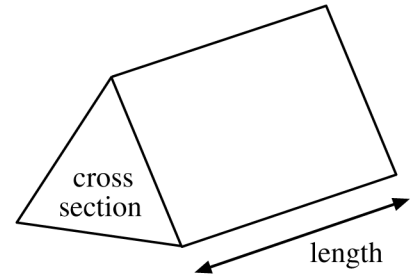The Formula Sheet is on page 2.

6390

Formula Sheet

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

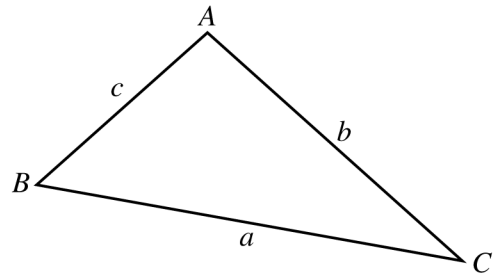**Volume of prism** = area of cross section × length

In any triangle *ABC*

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

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

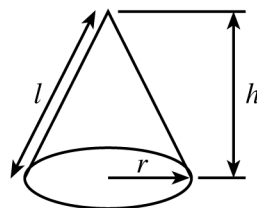**Cosine rule:** $a^2 = b^2 + c^2 - 2bc \cos A$

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

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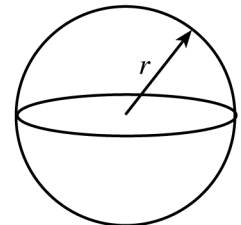
Volume of cone $= \frac{1}{3}\pi r^2 h$

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

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

6390

1   A new bicycle is priced at £240

In a sale it is reduced by 35%.

Calculate the sale price.

Answer £ _____ [3]

2   (a)   A ten pence piece has a radius of 1.4 cm.

Calculate the circumference of this coin.

© *The Royal Mint*

Answer _____ cm [2]

(b)   Explain why the sum of the interior angles in a regular pentagon is 540°.

_____

_____

_____

_____

[2]

6390

[Turn over

3 An adult ticket for a show costs £*a*.

A child ticket costs £4 less than an adult ticket.

Daisy buys two adult tickets and three child tickets. The total cost is £23

(a) Use this information to write down an **equation** in terms of *a*.

Answer _____ [3]

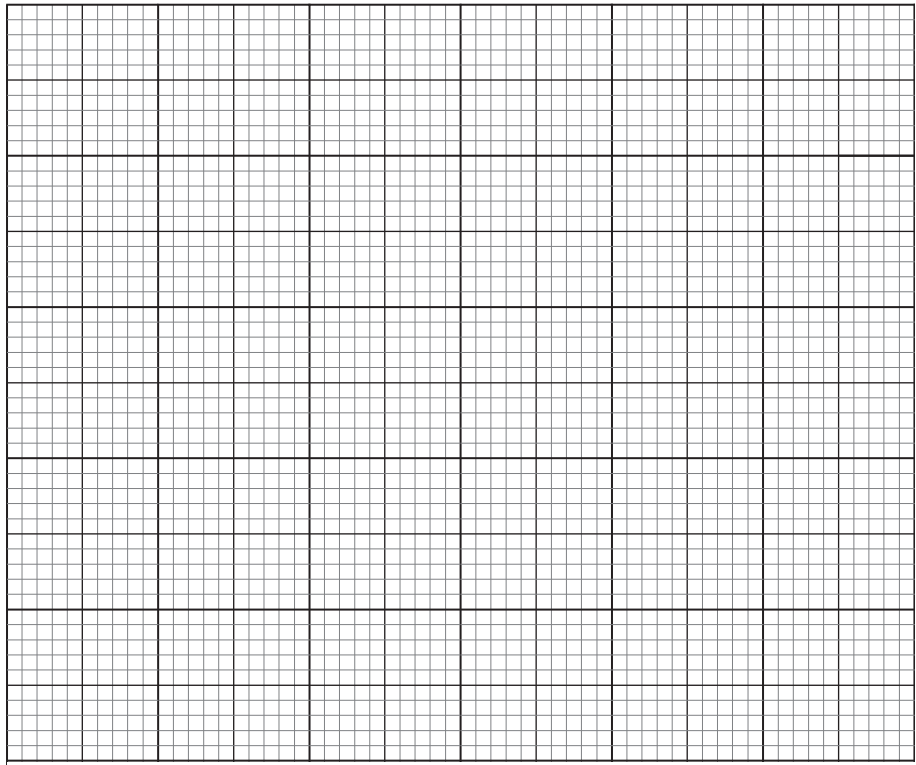**(b)** Solve your equation to find the cost of an adult ticket.

Answer £ _____ [2]

4 The increase in weight of 100 children over a period of time was recorded.

Increase in weight (*w* kg)	$0 < w \leq 5$	$5 < w \leq 10$	$10 < w \leq 15$	$15 < w \leq 20$	$20 < w \leq 25$
Frequency	16	36	22	14	12

(a) Show this information on a grouped frequency diagram. [3]
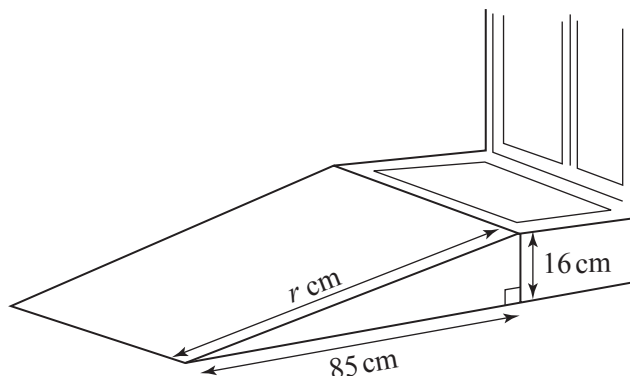
(b) Write down the modal class interval.

Answer_____ [1]

[Turn over

5 A ramp is placed next to a step to allow wheelchair access.

The ramp is 16 cm high and reaches 85 cm from the step.

Calculate the sloping length, r cm, of the ramp to the edge of the step.

Answer _____ cm [3]

---

6 **(a)** At birth a baby boy weighed 4 kg. Six weeks later he weighed 7 kg.

What was the percentage increase in his weight?

Answer _____ % [2]

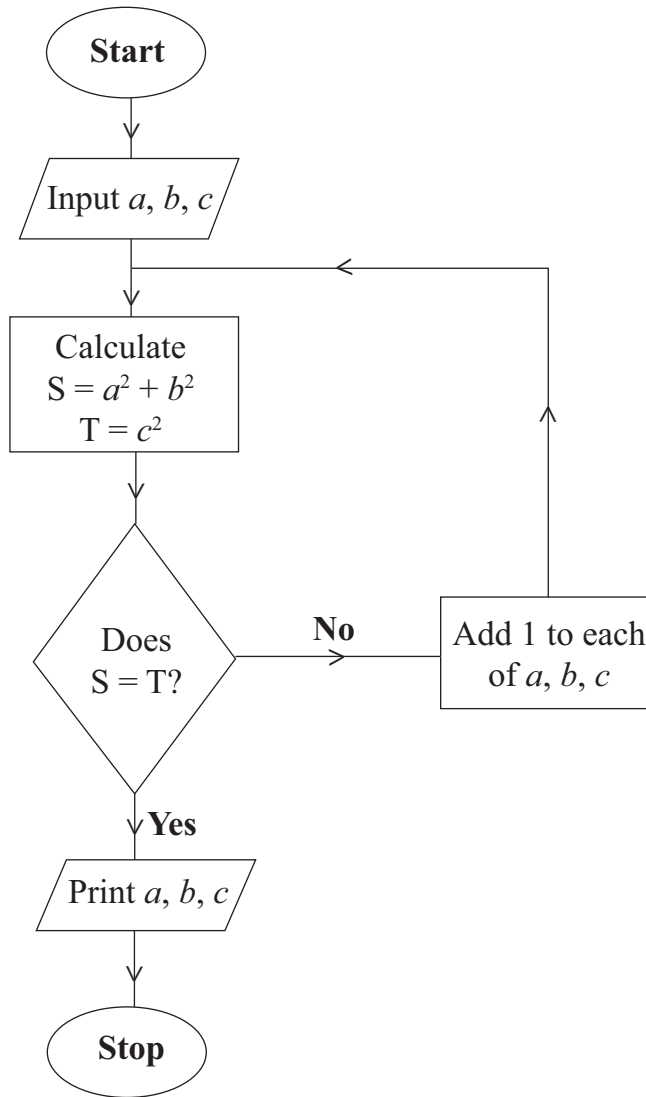**(b)** Colin leaves £4800 in the bank for two years.

It earns compound interest of 3% per year.

Calculate the total amount Colin has in the bank at the end of the two years.

Answer £ _____ [2]

6390

7

Start

Input a, b, c

Calculate
$S = a^2 + b^2$
$T = c^2$

Does
$S = T$?   **No**   →   Add 1 to each
of a, b, c

Yes

Print a, b, c

Stop

Starting with $a = 2$, $b = 9$, $c = 10$ use the flow chart to find the values printed.

a	b	c	S	T
2	9	10		

Answer $a =$ _____ , $b =$ _____ , $c =$ _____ [3]

8 One solution of $x^2 + 4x = 50$ lies between 5 and 6

Use the method of **trial and improvement** to find this solution correct to one decimal place. **Show all your working**.

Answer $x =$ _____ [3]

9 A large spherical glass marble has a radius of 2.5 cm:

Calculate the volume of glass in this marble correct to 2 decimal places.

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Answer _____ [3]

6390

10 A tea set has a sale price of £63.36 which is a saving of 12% on the original price.

What was the original price of the tea set?

Answer £ _____ [3]

11 (a) Factorise $10y + 4$

Answer _____ [1]

(b) Factorise $9a^2 - 3ay$

Answer _____ [2]

[Turn over

12 The graph opposite shows the cumulative frequency of scores obtained in a darts tournament.
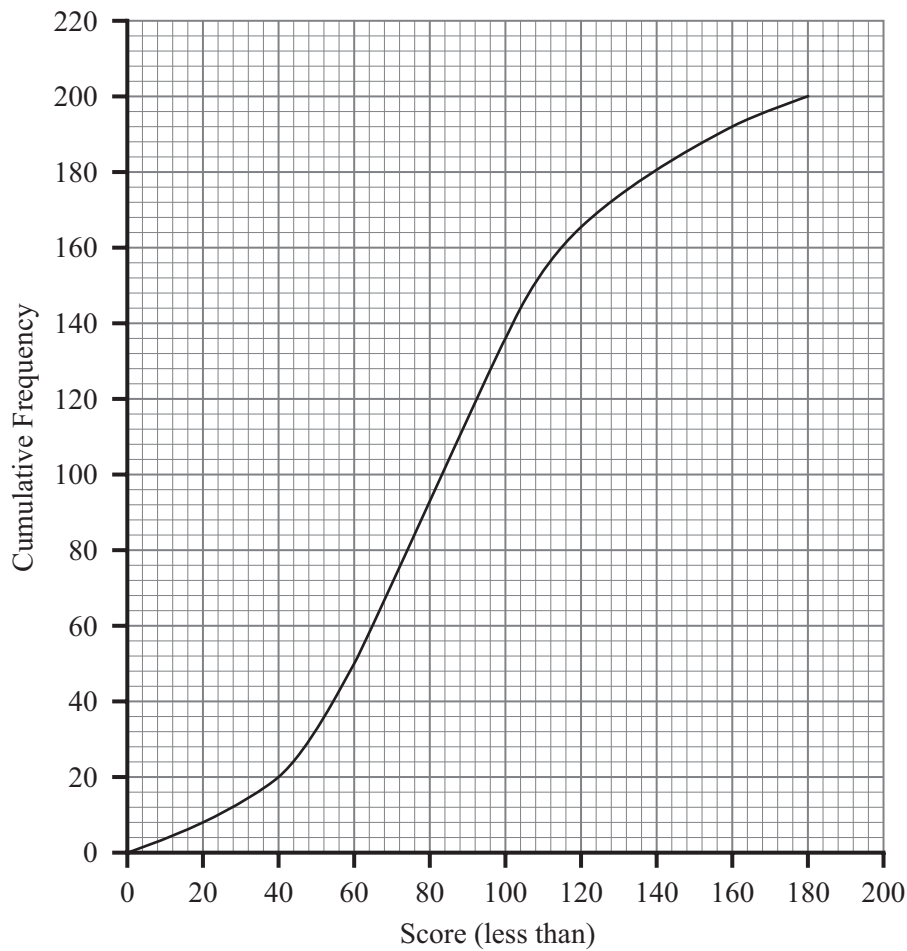
(a) Use the graph to estimate

    (i) the median,

<div align="center">Answer _____ [1]</div>

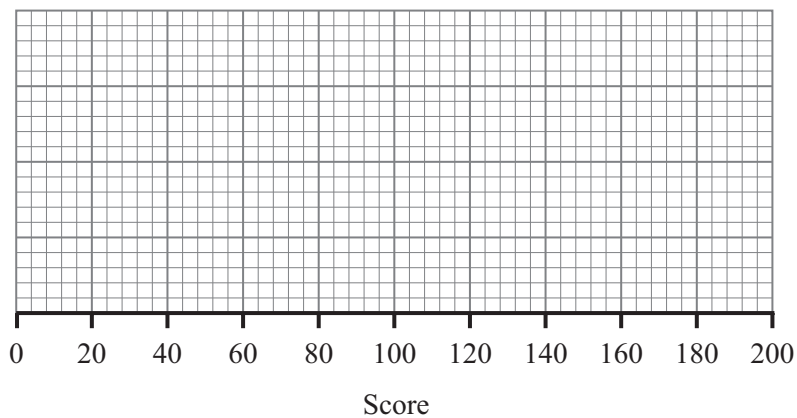   **(ii)** how many scores were more than 150

<div align="center">Answer _____ [2]</div>

(b) From the graph draw a box plot. [3]

Score

THIS IS THE END OF THE QUESTION PAPER

6390

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