| Candidate forename | | Candidate surname | |
|---|---|---|---|

| Centre number | | | | | | Candidate number | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

# OXFORD CAMBRIDGE AND RSA EXAMINATIONS
## GENERAL CERTIFICATE OF SECONDARY EDUCATION

# B282A

# MATHEMATICS C (GRADUATED ASSESSMENT)

## Terminal Paper (Section A) (Higher Tier)

**MONDAY 6 JUNE 2011: Afternoon**
**DURATION: 1 hour**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**Candidates answer on the question paper.**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Geometrical instruments**
**Tracing paper (optional)**
**Pie chart scale (optional)**

**WARNING**
**No calculator can be used for Section A of this paper.**

**READ INSTRUCTIONS OVERLEAF**

DC (CW/JG) 11MEP06267 47574/1

## INSTRUCTIONS TO CANDIDATES

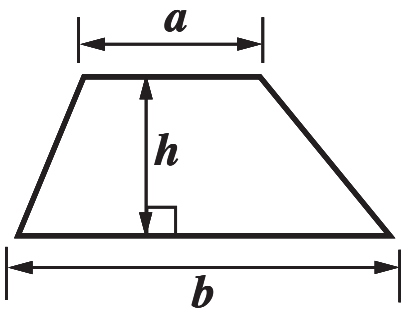
- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **Show your working. Marks may be given for a correct method even if the answer is incorrect.**
- **Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**
- **Answer ALL the questions.**

## INFORMATION FOR CANDIDATES

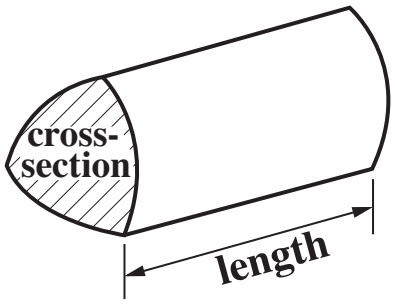
- **The number of marks is given in brackets [ ] at the end of each question or part question.**
- **The total number of marks for this Section is 50.**

# FORMULAE SHEET

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




**Volume of prism = (area of cross-section) × length**

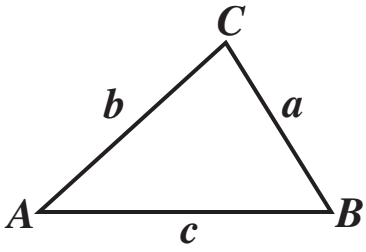



**In any triangle** $ABC$

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

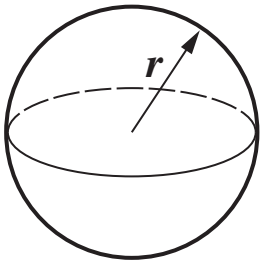
**Cosine rule** $a^2 = b^2 + c^2 - 2bc\cos A$

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



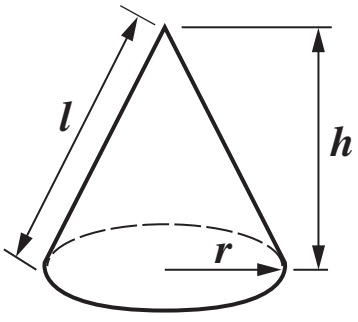

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$




**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi rl$




**The Quadratic Equation**

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

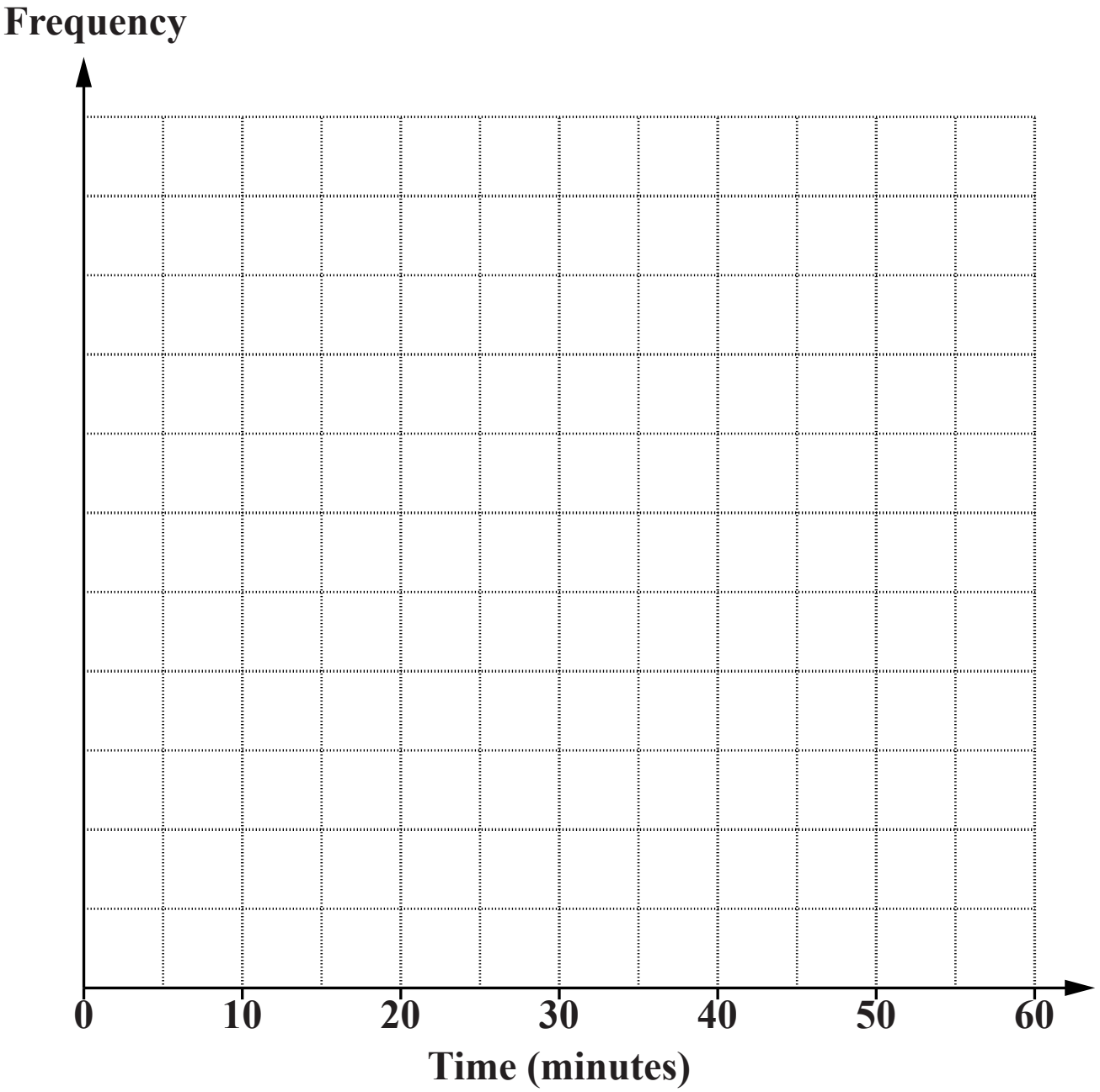
$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

**1** **A company records the lengths of times that customers wait for telephone calls to be answered.**
**This stem-and-leaf table gives the times, in completed minutes, for a sample of 60 calls.**

**KEY: 3 | 1 is 31 minutes**

| | |
|---|---|
| **0** | **0 1 1 1 2 2 3 3 4 4 6 8 9 9** |
| **1** | **0 0 0 1 1 1 2 2 3 3 5 5 5 5 7 7 7 8 9** |
| **2** | **0 0 1 3 3 3 3 5 7 8** |
| **3** | **1 1 2 2 5 5** |
| **4** | **0 0 3 3 5 5 8 8 9** |
| **5** | **3 7** |

**(a) Using appropriate class intervals, draw a frequency diagram to represent the distribution of these times.**




**[3]**

**(b) What is the probability that one of these customers, chosen at random, waited more than 30 minutes?**

**(b) _____ [2]**

**2 Given that $240 \times 18 = 4320$, work out the following.**

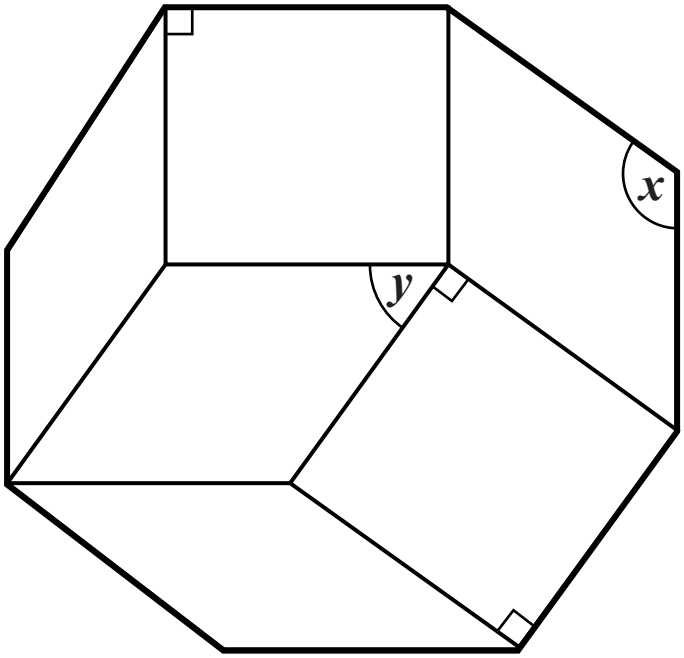
**(a) $24 \times 1{\cdot}8$**

**(a) _____ [1]**

**(b) $\frac{4320}{2400}$**

**(b) _____ [1]**

**3 A regular octagon is divided into 2 congruent squares and 4 congruent rhombuses.**




**NOT TO SCALE**

**Work out the sizes of angles *x* and *y*.**

*x* = _____ °

*y* = _____ ° **[4]**

**4 (a) Write 36 as a product of its prime factors.**

**(a) _____ [2]**

**(b) Find the lowest common multiple (LCM) of 36 and 60.**

**(b) _____ [2]**

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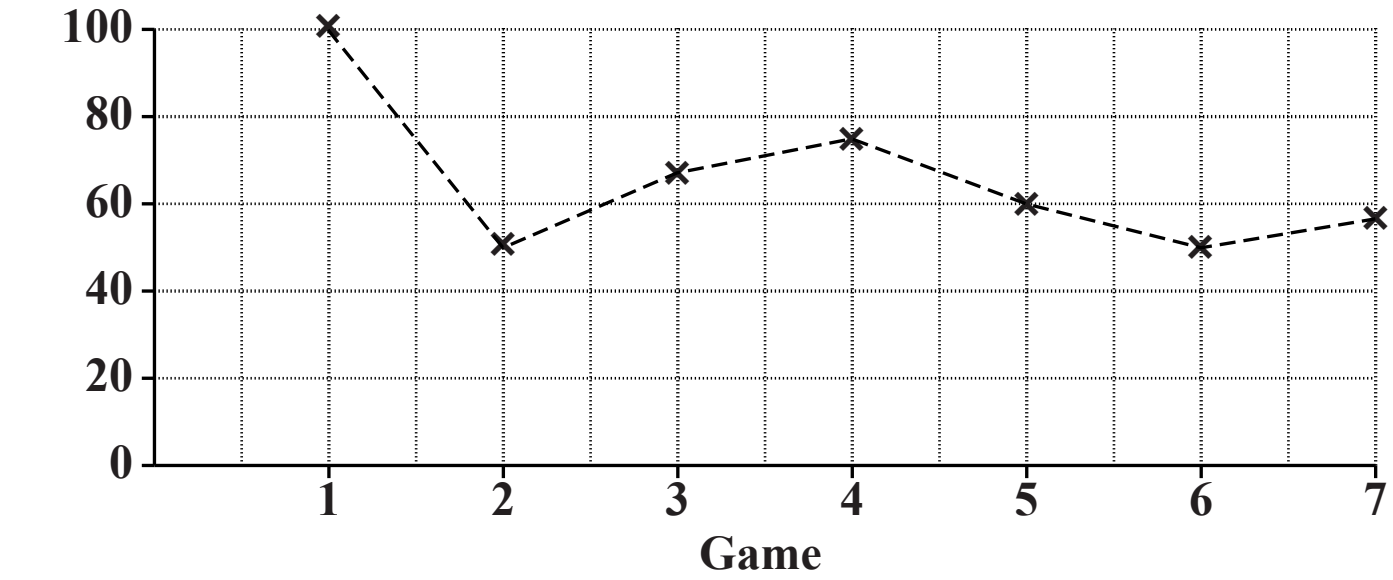
**TURN OVER FOR QUESTION 5**

**5 (a) The Hamble cricket team has either won or lost each of the first seven games of the season.**
**This graph shows the percentage of wins after each game.**




**(i) Use the graph to work out the result of each game.**
**Record W (won) or L (lost) for each game.**

| Game | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Result | | | | | | | |

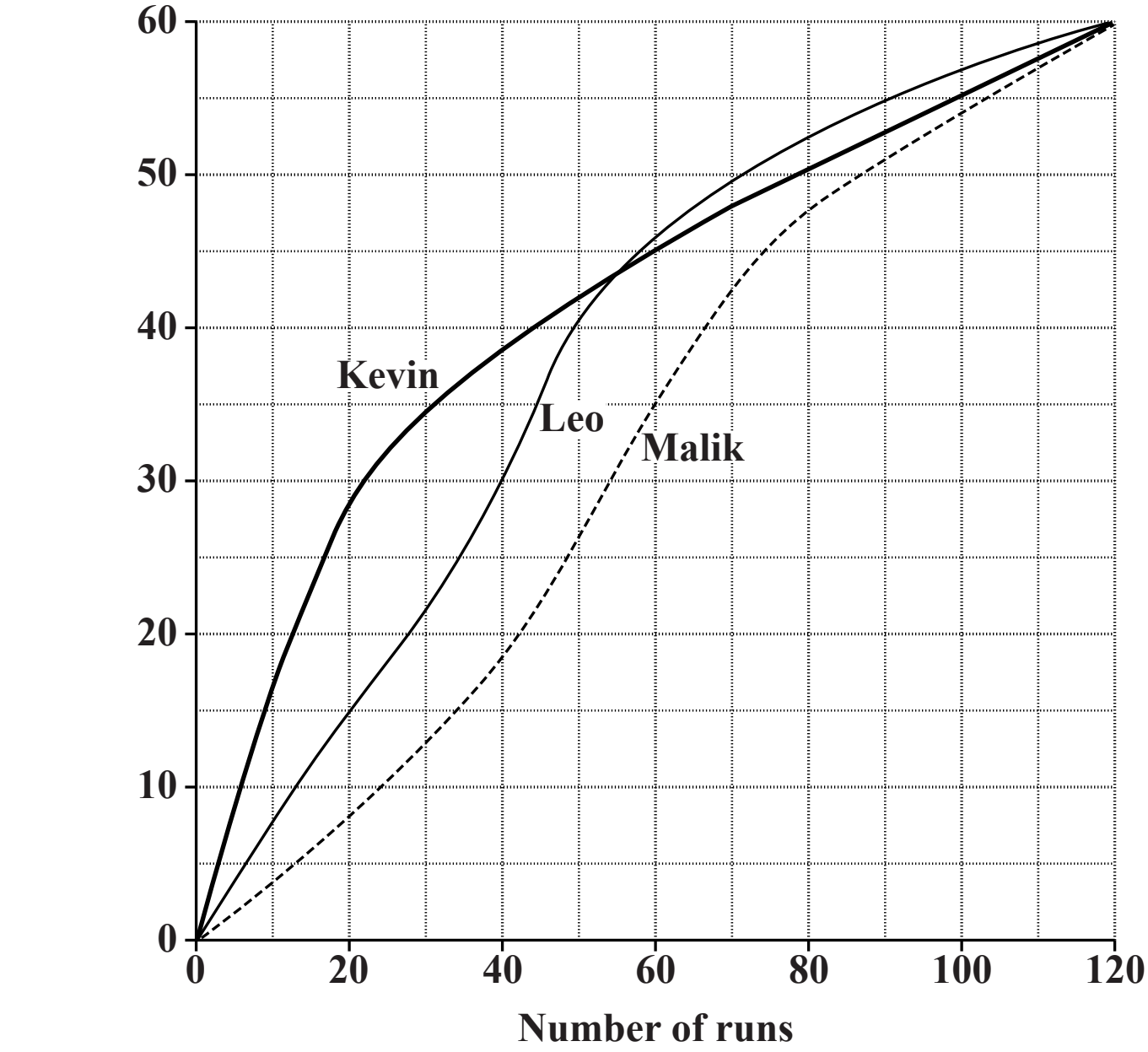
**[2]**

**(ii) Hamble won the eighth game.**

**Work out the percentage of these eight games that the team has won.**

**(a)(ii) _____ % [2]**

**(b) Kevin, Leo and Malik recorded the number of runs they scored in each of their last 60 games of cricket. These cumulative frequency graphs represent the distributions of runs scored by each of the three players.**



**(i) Use the graph to complete this table.**

| | Kevin | Leo | Malik |
|---|---|---|---|
| **Median number of runs** | **22** | **40** | |
| **Interquartile range (IQR) of the number of runs** | **51** | | **40** |

**[3]**

**(ii) Complete these statements using the graph or the table.**

**Kevin scored more than 50 runs in**

**_____ games.** **[1]**

**The most consistent player is**

**_____ .** **[1]**

**6 Work out.**

$$4\frac{1}{3} - 1\frac{4}{5}$$

**Give your answer as a mixed number.**

_____ **[3]**

**7 Solve.**

**(a)** $5x + 19 = 2(x - 4)$

**(a) _____ [3]**

**(b)** $x^2 - 7x + 12 = 0$

**(b) _____ [3]**

**8 Simplify.**

**(a)** $\frac{x^3}{x}$

**(a)** _____ **[1]**

**(b)** $x^3 \times x^4$

**(b)** _____ **[1]**

**(c)** $\frac{3x}{6x^3 + 9x}$

**(c)** _____ **[2]**

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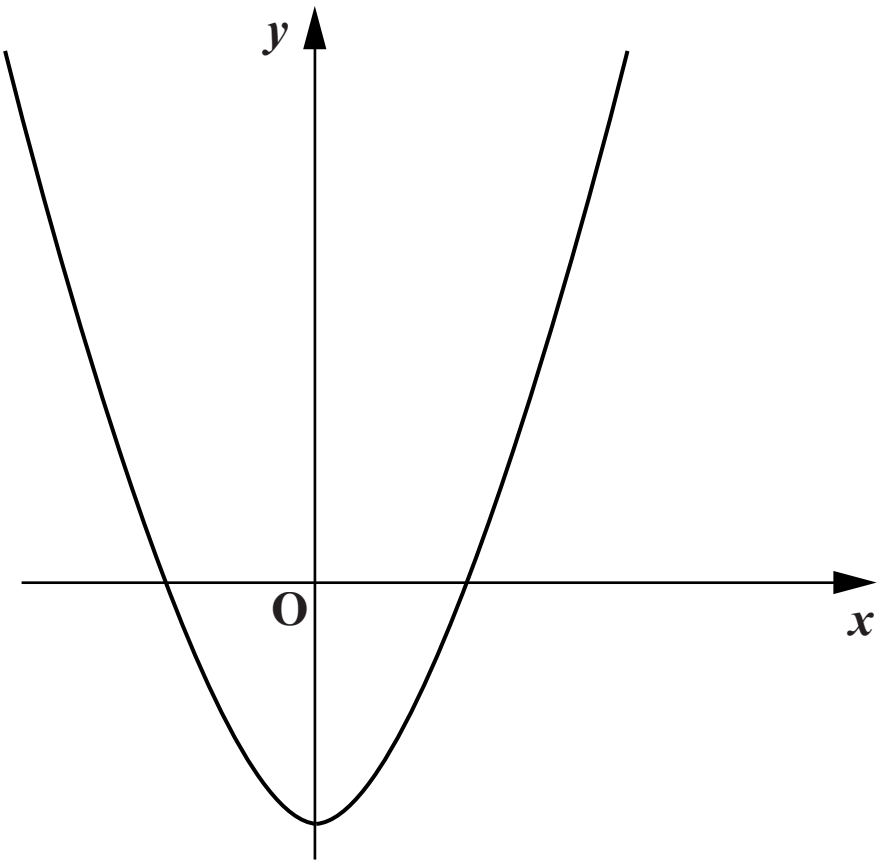
**TURN OVER FOR QUESTION 9**

**9 This is a sketch of $y = cx^2 + d$.**




**(a) The curve passes through the points (4, 40) and (−3, 19). Substituting $x = 4$ and $y = 40$ in $y = cx^2 + d$ gives this equation.**

$$40 = 16c + d$$

**Find another equation in $c$ and $d$.**

_____ **[1]**

**(b) Solve the simultaneous equations in part (a) to find the values of *c* and *d*.**

**(b)** $c =$ _____

$d =$ _____ **[2]**

**10 In a competition three boys, Giles, Harry and John, have scored equal points.**
**Only one boy can go through to the next round.**

**The organiser suggests that Giles and Harry should spin a coin and then the winner should spin a coin with John. The winner of the second spin would then go through to the next round.**

**Work out the probability for each boy to go through to the next round.**

**Giles _____**

**Harry _____**

**John _____ [2]**

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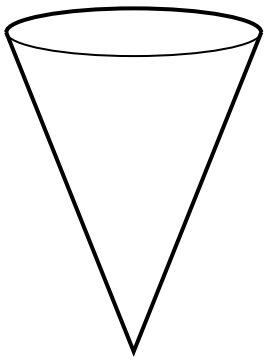
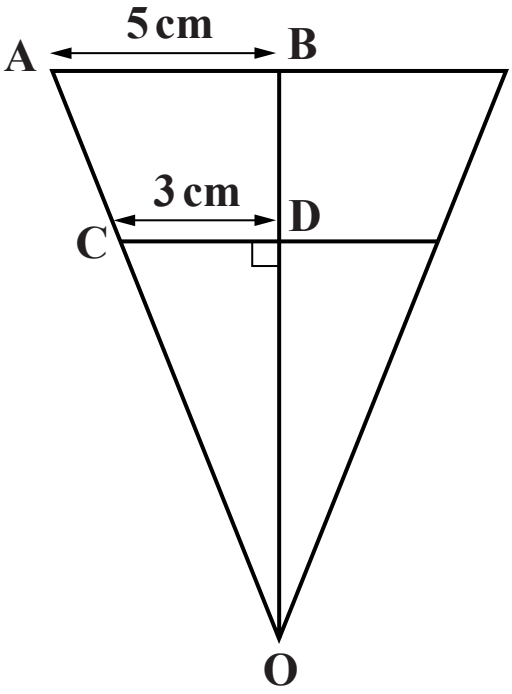
**TURN OVER FOR QUESTION 11**

**11 This paper cup is in the shape of a cone.**



**The radius of the cone, AB, is 5 cm.**
**The cup is held vertically, as shown, and contains 250 ml of water when full.**
**The diagram shows the vertical cross-section through the centre of the cup.**




**NOT TO SCALE**

**Water is poured into the cup to a depth DO.**
**CD = 3 cm.**

**(a) Explain why triangles OAB and OCD are similar.**

_____

_____

_____ **[1]**

**(b) Calculate the amount of water in the partially filled cup.**

**(b) _____ ml [3]**

**TURN OVER FOR QUESTION 12**

**12 (a) Write $x^2 - 8x + 27$ in the form $(x - a)^2 + b$.**

**(a) _____ [3]**

**(b) Hence write down the minimum value of $x^2 - 8x + 27$.**

**(b) _____ [1]**

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