

2500/405

NATIONAL
QUALIFICATIONS
2007

THURSDAY, 3 MAY
1.30 PM – 2.25 PM

MATHEMATICS
STANDARD GRADE
Credit Level
Paper 1
(Non-calculator)

- 1 You may **NOT** use a calculator.
- 2 Answer as many questions as you can.
- 3 Full credit will be given only where the solution contains appropriate working.
- 4 Square-ruled paper is provided.



FORMULAE LIST

The roots of $ax^2 + bx + c = 0$ are $x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

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

Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$ or $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

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

Standard deviation: $s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}} = \sqrt{\frac{\sum x^2 - (\sum x)^2 / n}{n - 1}}$, where n is the sample size.

KU	RE
2	
2	
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3	
3	

1. Evaluate

$$6.04 + 3.72 \times 20.$$

2. Evaluate

$$3\frac{1}{6} \div 1\frac{2}{3}.$$

3. There are 400 people in a studio audience.

The probability that a person chosen at random from this audience is male is $\frac{5}{8}$.

How many males are in this audience?

- 4.

$$P = \frac{2(m-4)}{3}$$

Change the subject of the formula to m .

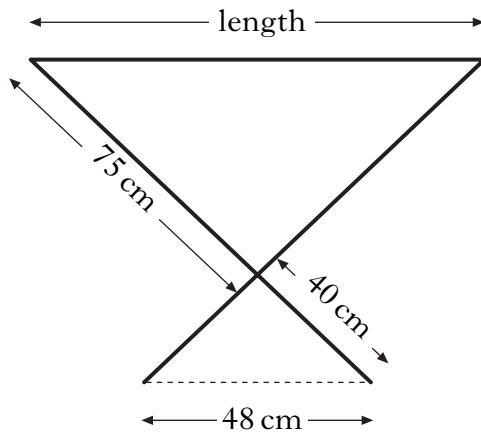
5. Remove brackets and simplify

$$(2x + 3)^2 - 3(x^2 - 6).$$

[Turn over

8. Mick needs an ironing board.

He sees one in a catalogue with measurements as shown in the diagram below.



When the ironing board is set up, two similar triangles are formed.

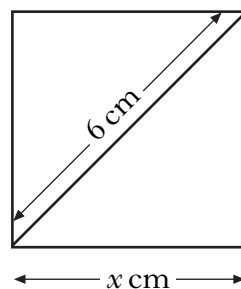
Mick wants an ironing board which is at least 80 centimetres in length.

Does this ironing board meet Mick's requirements?

Show all your working.

3

9. A square of side x centimetres has a diagonal 6 centimetres long.



Calculate the value of x , giving your answer as a surd in its simplest form.

3

[Turn over

10. A relationship between T and L is given by the formula, $T = \frac{k}{L^3}$ where k is a constant.

When L is doubled, what is the effect on T ?

11. (a) A cinema has 300 seats which are either standard or deluxe.
Let x be the number of standard seats and y be the number of deluxe seats.

Write down an algebraic expression to illustrate this information.

- (b) A standard seat costs £4 and a deluxe seat costs £6.

When all the seats are sold the ticket sales are £1380.

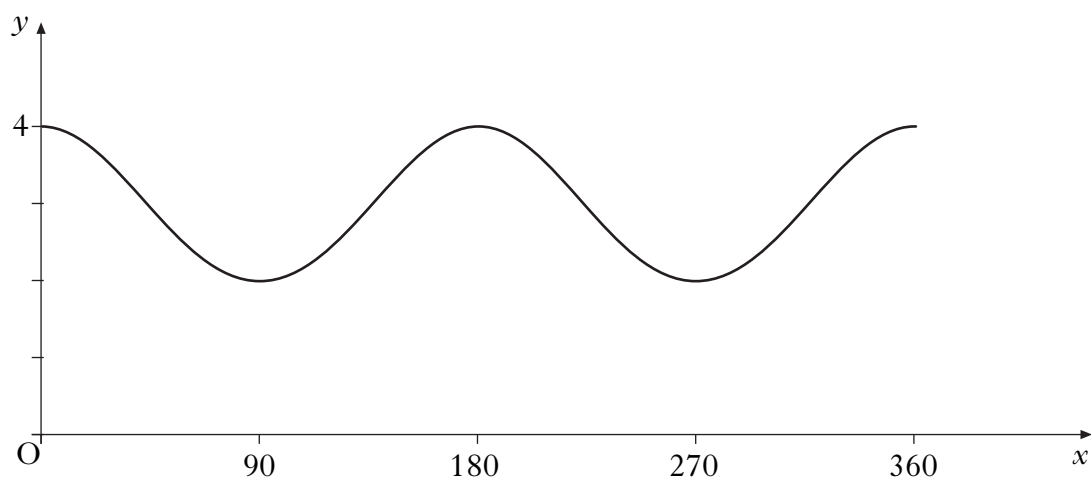
Write down an algebraic expression to illustrate this information.

- (c) How many standard seats and how many deluxe seats are in the cinema?

KU	RE
	2
1	
2	
	3

KU	RE
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13. Part of the graph of $y = \cos bx^\circ + c$ is shown below.



Write down the values of b and c .

14. The **sum** S_n of the first n terms of a sequence, is given by the formula

$$S_n = 3^n - 1.$$

- (a) Find the **sum** of the first 2 terms.
- (b) When $S_n = 80$, calculate the value of n .

[END OF QUESTION PAPER]