

2500/405

NATIONAL
QUALIFICATIONS
2008

THURSDAY, 8 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: 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.

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1. Evaluate

$$24 \cdot 7 - 0 \cdot 63 \times 30.$$

2. Factorise fully

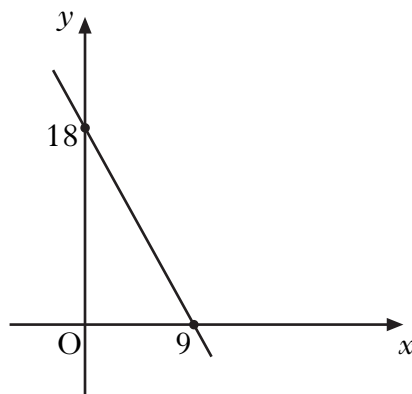
$$5x^2 - 45.$$

3.

$$W = BH^2.$$

Change the subject of the formula to H .

4. A straight line cuts the x -axis at the point $(9, 0)$ and the y -axis at the point $(0, 18)$ as shown.



Find the equation of this line.

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5. Express as a single fraction in its simplest form

$$\frac{1}{p} + \frac{2}{(p+5)}$$

6. Jane enters a two-part race.

(a) She cycles for 2 hours at a speed of $(x + 8)$ kilometres per hour.

Write down an expression in x for the distance cycled.

(b) She then runs for 30 minutes at a speed of x kilometres per hour.

Write down an expression in x for the distance run.

(c) The **total** distance of the race is 46 kilometres.

Calculate Jane's **running** speed.

7. The 4th term of each number pattern below is the **mean** of the previous three terms.

(a) When the first three terms are 1, 6, and 8, calculate the 4th term.

(b) When the first three terms are x , $(x + 7)$ and $(x + 11)$, calculate the 4th term.

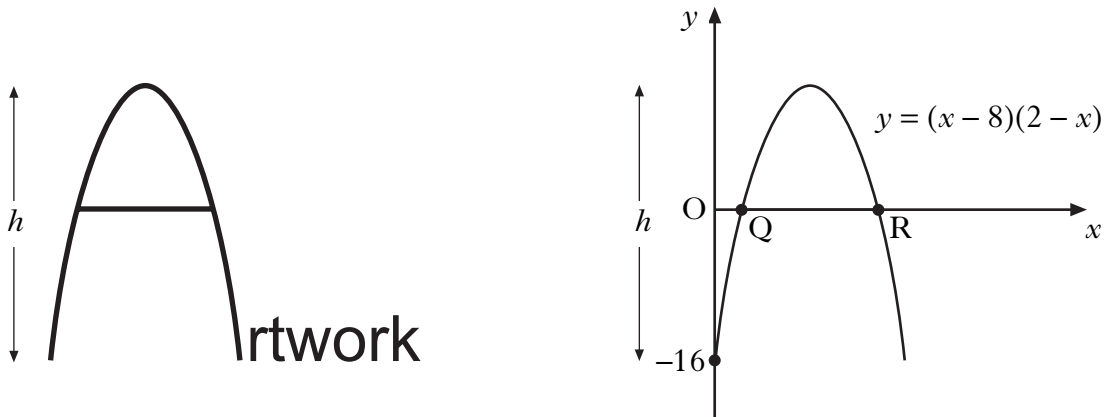
(c) When the first, second and fourth terms are

$$-2x, \quad (x + 5), \quad \text{---}, \quad (2x + 4),$$

calculate the 3rd term.

8. The curved part of the letter A in the *Artwork* logo is in the shape of a parabola.

The equation of this parabola is $y = (x - 8)(2 - x)$.



- (a) Write down the coordinates of Q and R.

- (b) Calculate the height, h , of the letter A.

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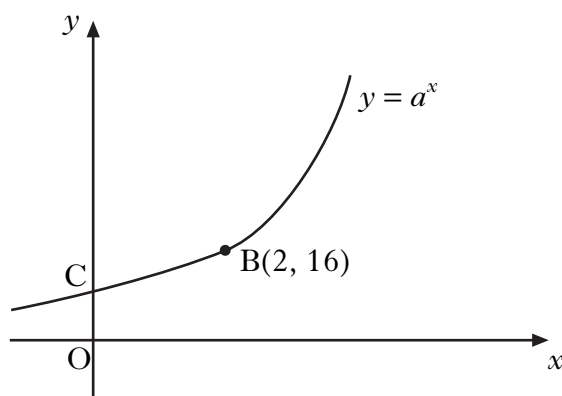
9. Simplify

$$m^3 \times \sqrt{m}.$$

2

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10. Part of the graph of $y = a^x$, where $a > 0$, is shown below.



The graph cuts the y -axis at C .

(a) Write down the coordinates of C .

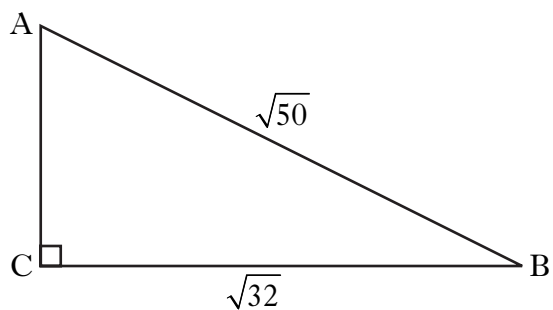
1

B is the point $(2, 16)$.

(b) Calculate the value of a .

2

11. A right angled triangle has dimensions as shown.



Calculate the length of AC , leaving your answer as a surd **in its simplest form**.

3

KU	RE
3	
	3

12. Given that

$$x^2 - 10x + 18 = (x - a)^2 + b,$$

find the values of a and b .

13. A new fraction is obtained by adding x to the numerator and denominator of the fraction $\frac{17}{24}$.

This new fraction is equivalent to $\frac{2}{3}$.

Calculate the value of x .

[END OF QUESTION PAPER]

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