

2500/405

NATIONAL
QUALIFICATIONS
2004

FRIDAY, 7 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.

1. Evaluate

$$6 \cdot 2 - (4 \cdot 53 - 1 \cdot 1).$$

2

2. Evaluate

$$\frac{2}{5} \text{ of } 3\frac{1}{2} + \frac{4}{5}.$$

3

3. $A = 2x^2 - y^2$.

Calculate the value of A when $x = 3$ and $y = -4$.

2

4. Simplify

$$\frac{3}{m} + \frac{4}{(m+1)}.$$

3

5. The average monthly temperature in a holiday resort was recorded in degrees Celsius ($^{\circ}\text{C}$).

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Average Temperature ($^{\circ}\text{C}$)	1	8	8	10	15	22	23	24	20	14	9	4

Draw a suitable statistical diagram to illustrate the median and the quartiles of this data.

4

[Turn over

6. Marmalade is on special offer.

Each jar on special offer contains 12.5% more than the standard jar.



A jar on special offer contains 450 g of marmalade.

How much does the standard jar contain?

3

7. John's school sells 1200 tickets for a raffle.

John buys 15 tickets.

John's church sells 1800 tickets for a raffle.

John buys 20 tickets.

In which raffle has he a better chance of winning the first prize?

Show clearly all your working.

3

8. 7, -2, 5, 3, 8

In the sequence above, each term after the first two terms is the sum of the previous two terms.

For example: 3rd term = 5 = 7 + (-2)

(a) A sequence follows the above rule.

The first term is x and the second term is y .

The fifth term is 5.

$x, y, -, -, 5$

Show that $2x + 3y = 5$

2

(b) Using the same x and y , another sequence follows the above rule.

The first term is y and the second term is x .

The sixth term is 17.

$y, x, -, -, -, 17.$

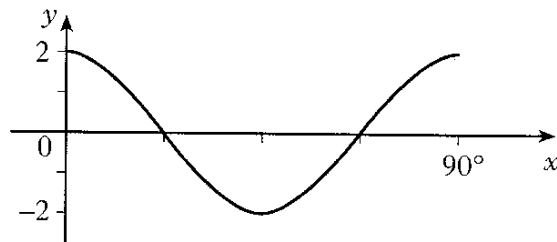
Write down another equation in x and y .

2

(c) Find the values of x and y .

3

9. The graph of $y = a \cos bx^\circ, 0 \leq x \leq 90$, is shown below.



Write down the values of a and b .

2

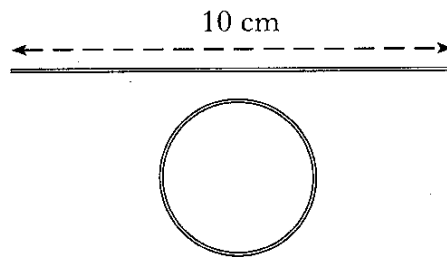
[Turn over for Questions 10, 11 and 12 on Page six

KU	RE
	3
2	
2	
	4

10. Two variables x and y are connected by the relationship $y = ax + b$.
Sketch a possible graph of y against x to illustrate this relationship when a and b are each less than zero.

11. (a) Simplify $2\sqrt{75}$.
(b) Evaluate $2^0 + 3^{-1}$.

12. A piece of gold wire 10 centimetres long is made into a circle.



The circumference of the circle is equal to the length of the wire.

Show that the area of the circle is **exactly** $\frac{25}{\pi}$ square centimetres.

[END OF QUESTION PAPER]