



BINA BANGSA SCHOOL KJS
MATHEMATICS DEPARTMENT

TOPICAL TEST: CHAPTER 1 QUADRATIC FUNCTIONS
SEC 3 ACCELERATED TAYLOR

NAME: _____

DATE: _____

1. Sketch the graph of each of the following functions.
Find the maximum or minimum value and the value of x at which the maximum or minimum value occurs. **Choose and answer only 2 items.** **[10]**

(a) $y = 5(x + 3)(x - 4)$

(b) $y = (10 - x)(4x + 1)$

(c) $y = 3(x - 2)^2 - 6$

2. Express the following functions in the form $y = a(x - h)^2 + k$.
Choose and answer only 2 items. **[6]**

(a) $y = \frac{1}{3}x^2 + 4x$

(b) $y = 3 - 10x - x^2$

(c) $y = 5(x - 4)(x + 8)$

- 3.
- (i) Express $-2x^2 - 10x - 3$ in the form $y = a(x - h)^2 + k$. [3]
 - (ii) Hence, sketch the graph of $y = -2x^2 - 10x - 3$.
State its maximum value and the value of x when the maximum occurs. [5]
 - (iii) The graph of $y = -2x^2 - 10x - 3 + p$, where p is an integer, does not intersect the x -axis. Give a possible value for p . [2]

4. The expression $\frac{1}{10}(x^2 - x) + c$, where c is a constant, can never be less than -3 .
Can we conclude that the value of c is -3 ?
If we cannot do so, show your working to obtain the correct value of c . [3]

5. Real-World Application: Growth of bacteria.

The data in the table below shows the growth of some bacteria, N , in a controlled experiment after t hours.

t	10	12	14	16	18
N	1000	1700	2600	3700	5000

It is believed that a function of the form $N = 25t^2 - 200t + 500$ represents the growth of the bacteria.

- (i) Explain the meaning of the constant term 500 in the equation. [1]
- (ii) Predict the number of bacteria 24 hours after the start of the experiment. [1]
- (iii) Is it accurate to conclude that the number of bacteria in the experiment was always increasing from the start of the experiment?
Include a graph/sketch in your explanation. [4]