3055 BA SANGAM COLLEGE

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Week 11

BA SANGAM COLLEGE **YEAR 11**

SUBJECT: MATHEMATICS **NAME OF STUDENT: _____**

STRAND	*GRAPHS*
SUB-STRAND	*QUADRATIC GRAPH*
Content Learning Outcome	➢ Study and illustrate graphs

QUADRATIC GRAPH IN THE FORM $y = a(x \pm h)^2 \pm k$

Objective : at the end of the lesson students should be able to sketch quadratic graph in the form $y = a(x \pm h)^2 \pm k$

IMPORTANT NOTES:

• ***(h, k)*** is the vertex or turning point of the parabola, and ***x = h*** is the axis of symmetry.
• The ***h*** represents a horizontal shift (how far left, or right, the graph has shifted from $x = 0$).
• The ***k*** represents a vertical shift (how far up, or down, the graph has shifted from $y = 0$).
• notice that the ***h*** value is subtracted in this form, and that the ***k*** value is added. If the equation is $y = 2(x - 1)^2 + 5$, the value of ***h*** is 1, and ***k*** is 5.
If the equation is $y = 3(x + 4)^2 - 6$, the value of ***h*** is -4, and ***k*** is -6.

Example 1

Sketch the graph of $y = 3(x - 2)^2 - 4$

STEP 1 : calculate the x and y intercepts of the graph

x int let y = 0

$0 = 3(x - 2)^2 - 4$

$4 = 3(x - 2)^2$

$4/3 = (x - 2)$

$\pm\sqrt{\frac{4}{3}} = x - 2$

Therefore x int are (10/3, 0) and (2/3, 0)

y int let x = 0

$y = 3(0 - 2)^2 - 4$

$y = 4$

Therefore y int is (0, 8)

STEP 2 : Pull out the values for ***h*** and ***k***.
If necessary, rewrite the function so you can clearly see the *h* and *k* values.
(h, k) is the vertex of the parabola.
Plot the vertex
$y = 3(x - 2)2 + (-4)$
$h = 2$; $k = -4$
Vertex: (2, -4)

STEP 3: The line $x = h$ is the axis of symmetry.
Draw the axis of symmetry.
$x = 2$ is the axis of symmetry

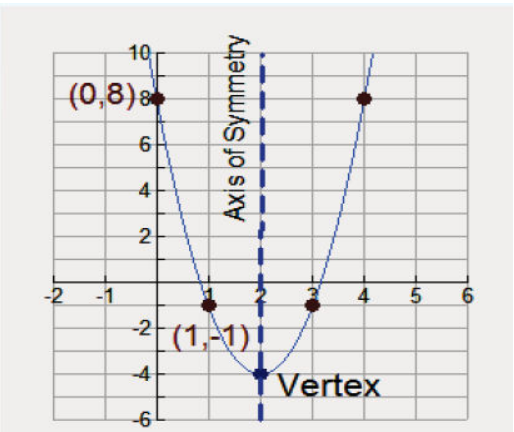
STEP 4: Check for the shape of the graph
Positive $x^2 \longrightarrow \cup$ shape curve { negative $x^2 \longrightarrow \cap$ shape curve }

STEP 5: Plot the mirror images of these points across the axis of symmetry, or plot new points on the right side. Draw the parabola.

Remember, when drawing the parabola to avoid "connecting the dots" with straight line segments.

A parabola is curved, not straight, as its slope is not constant.

GRAPH



ACTIVITY

1. Determine the coordinates of the turning point of the following quadratic graphs:

a. $y + 1 = (x - 1)^2$ (1m)

b. $y - 4 = 3 (x + 1)^2$ (1m)

2.Sketch the graph of the following giving the coordinates of the vertex and the equation of the axis of symmetry.

a. $y = (x - 2)^2 + 3$ (3m)

THE END