3055 BA SANGAM COLLEGE

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WORKSHEET 13

School: Ba Sangam College **Year / Level: 11**

Subject: Mathematics **Name of Student: _____**

Strand	3 – Graphs
Sub strand	3.1 – Graphs and Intersections
Content Learning Outcome	➢ Studying and interpreting graphs

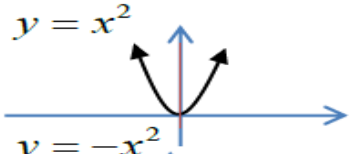
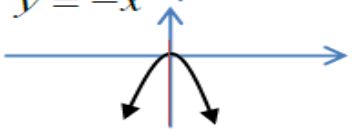
Transformation of Quadratic Graphs

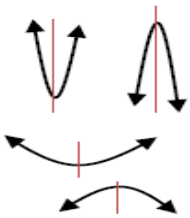
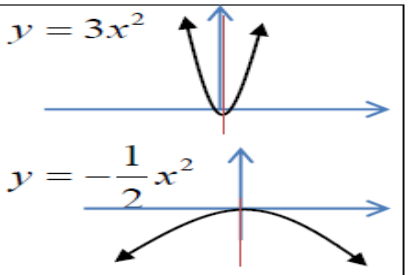
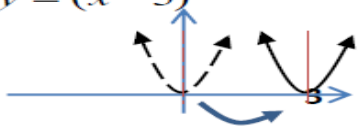
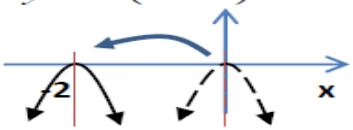
Note:
In general, the transformation of Quadratic equation will have the form:

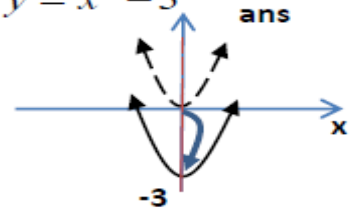
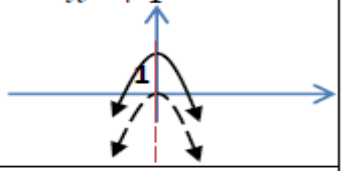
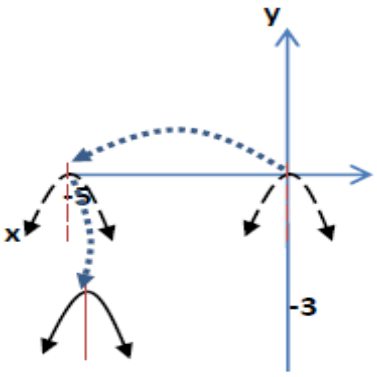
$$y = \pm a(x \pm b)^2 \pm c$$

Shape ± Stretching Shifting along x – axis Shifting along y - axis

The table below shows how the transformation works by shifting the basic shape:

General Form	Explanation	Diagram	Example
$y = \pm x^2$ This is the basic shape to start with. It will be at the origin (0,0) with y – axis as the line of symmetry	Shape: $+x^2$ $-x^2$	Positive shape  Negative shape 	$y = x^2$  $y = -x^2$ 

$y = \pm ax^2$ In front i.e. the coefficient of x^2	Stretching: *-1 > a and a > 1* *Narrow* *-1 < a < 1* *Wide*		$y = 3x^2$  $y = -\frac{1}{2}x^2$
$y = (x \pm b)^2$	Shifting along x-axis: + b move left - b move right	Horizontal line  +b - b	$y = (x-3)^2$  $y = -(x+2)^2$ 

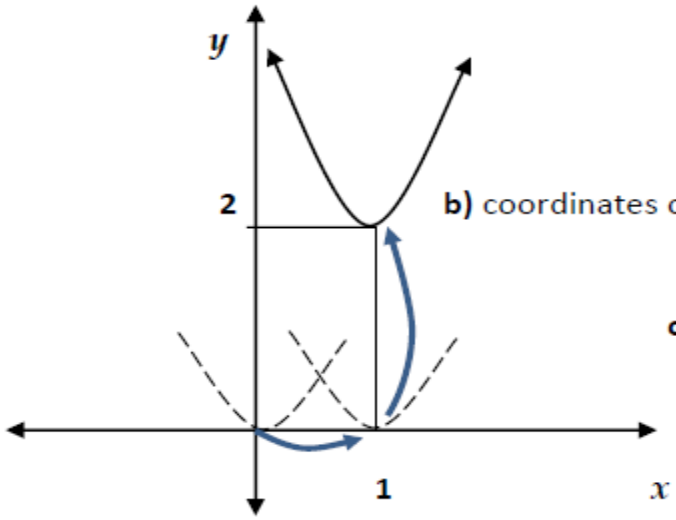
$y = x^2 \pm c$	Shifting along y-axis: + c move up - c move down	 + c up - c down	$y = x^2 - 3$  ans x -3 $y = -x^2 + 1$ 
$y = \pm a(x \pm b)^2 \pm c$	Combination of all shifting	5 unit left and 3 unit down	$y = -(x+5)^2 - 3$  y x -5 -3

EXAMPLE 1: The equation is given as $y = (x - 1)^2 + 2$.

(a) Sketch the graph. Clearly show the intercepts
(b)Give the coordinates of the vertex
(c) State the range of the function

Answers:

a)



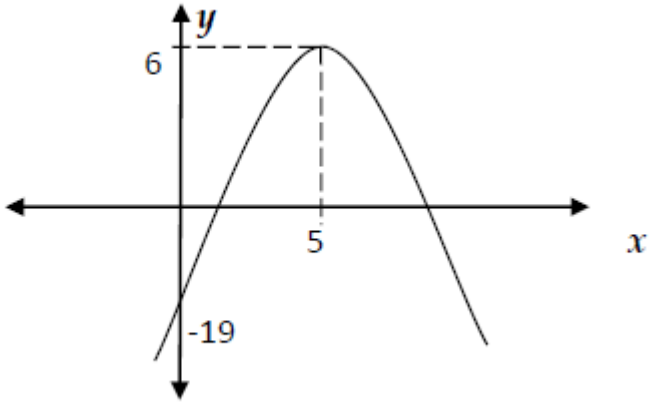
b) coordinates of the vertex: (1, 2)

c) Range $\{ y : y \geq 2, y \in R \}$

ACTIVITY

1.

The diagram given below shows the graph of $y = f(x)$

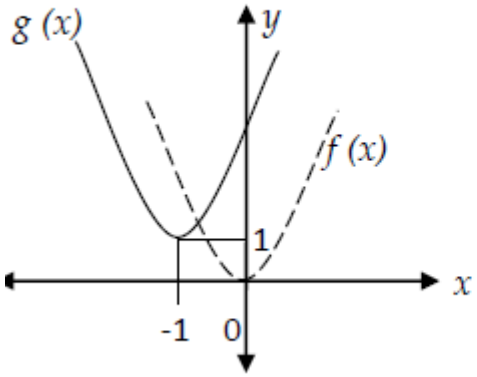


Find the equation of the graph of $f(x)$

(2 marks)

2.

The graph of f (x) has been transformed to $y = g(x)$ and the resulting graph is shown. Find the most appropriate equation for $g(x)$.



(2 marks)

3.

The equation is given as $y = -(x+2)^2 - 1$.

(a) Sketch the graph. Clearly show the intercepts **(3 marks)**

(b) Give the coordinates of the vertex	**(1 mark)**
(c) Identify the axis of symmetry.	**(1 mark)**
(d) State the range of the function	**(1 mark)**

THE END