PENANG SANGAM HIGH SCHOOL
DEPARTMENT OF MATHEMATICS/PHYSICS
YEAR 11 MATHEMATICS - WEEK 16

STRAND 4 **GRAPHS**

4.1 GRAPHS

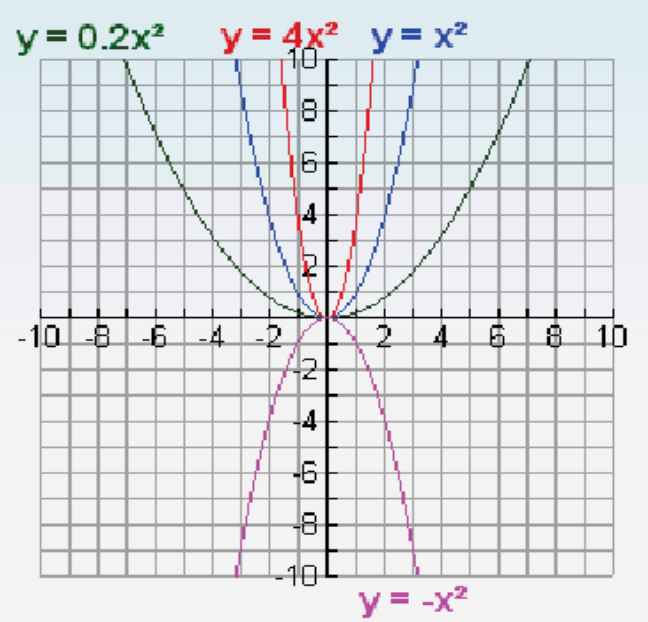
Learning Objective
At the end of this lesson, students should be able to:
- Draw and transform quadratic graphs

Quadratic Functions

1) The graph of $y = x^2$ gets thinner or narrower for $y = ax^2$ if $a > 1$

2) The graph of $y = x^2$ gets fatter or wider for $y = ax^2$ if $a < 1$

3) The graph of $y = x^2$ gets reflected in the x – axis for $y = ax^2$ if "a" is negative



Example 1: Sketch the graph of $y = x^2 - 4x$ clearly showing the intercepts and the

x-intercept: Let y = 0

$y = x^2 - 4x$

$0 = x^2 - 4x$

$0 = x(x - 4)$

$x = 0$

$x - 4 = 0$

$x - 4 + 4 = 0 + 4$

y-intercept: Let x = 0

$y = x^2 - 4x$

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

$y = 0$

Vertex:x value

midpoint of x values

$x = \frac{x^1 + x^2}{2}$

$0 + 4$

Shape $\rightarrow$ *+ ve*

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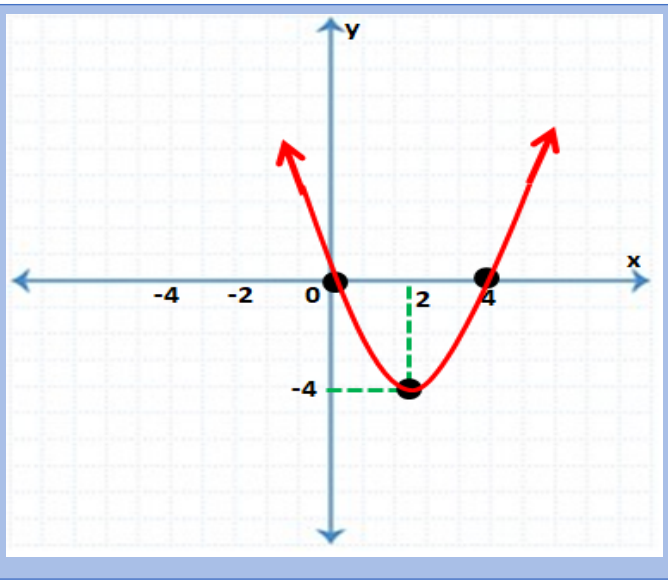
Vertex: y value

$y = x^2 - 4x$

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



Example 2: **Sketch the graph of** $y = 9 - x^2$ **clearly showing the intercepts and the turning point.**

x-intercept: Let y = 0

$$y = 9 - x^2$$

$$0 = 9 - x^2$$

$$0 = 3^2 - x^2$$

$$0 = (3 - x)(3 + x)$$

y-intercept: Let x = 0

$$y = 9 - x^2$$

$$y = 9 - (0)^2$$

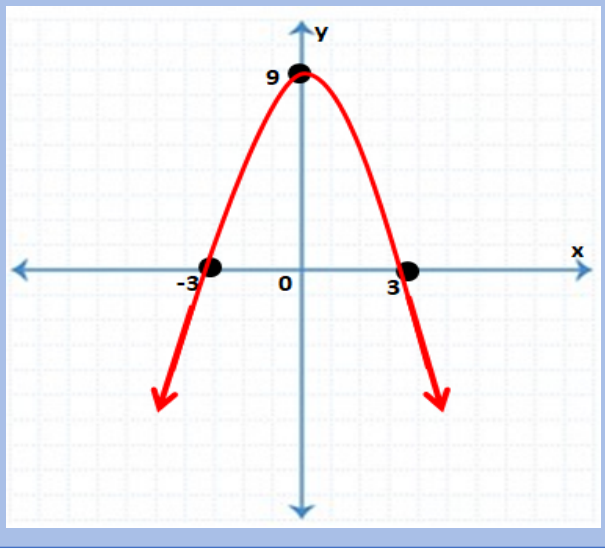
$$y = 9$$

Vertex:x value

midpoint of x values

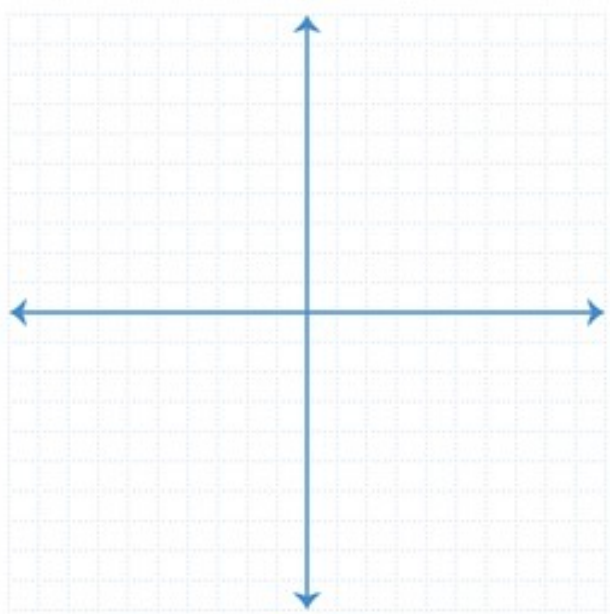
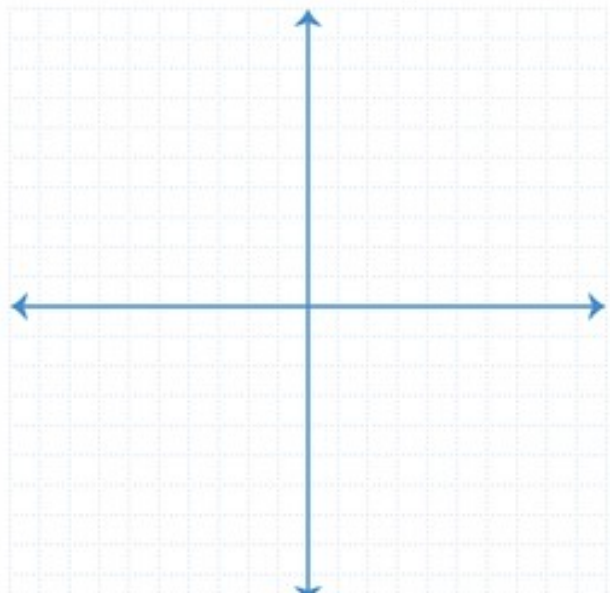
$$x = \frac{x^1 + x^2}{2}$$

$$3 + -3$$



Exercise: Sketch the graph of the following quadratic equations clearly showing the intercepts and the turning point.

1) $y = 2x - x^2$



2) $y = x^2 - 9$