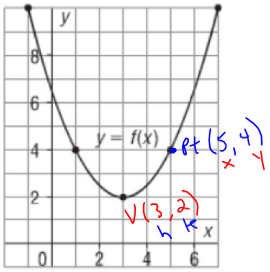
Lesson 5 Determining Equations of Quadratic Functions

Example 1
Determine the equation of the quadratic function.



$y = a(x-h)^2 + k$

$4 = a(5-3)^2 + 2$

$4^{-2} = a(4) + 2^{-2}$

$\frac{2}{4} = \frac{4a}{4}$

$\frac{1}{2} = a$

$\therefore y = \frac{1}{2}(x-3)^2 + 2$

① Sub in h, k, x and y from vertex and one point.
② Solve for a
③ Sub in a, h and k to $y = a(x-h)^2 + k$

Example 2
Determine the equation of a quadratic function congruent to $y = 3x^2$, opening downward with vertex at (-1, 5).

same size

$y = a(x-h)^2 + k$

$y = -3(x+1)^2 + 5$

Example 3
Determine the equation of a quadratic function with x-intercepts -1 and 3 and vertex at (1, -4).

pts (-1, 0) and (3, 0)

choose one !!

$y = a(x-h)^2 + k$

$0 = a(-1-1)^2 - 4$

$0 + 4 = a(4) - 4 + 4$

$4 = 4a$

$a = 1$

$\therefore y = (x-1)^2 - 4$

(-1, 0) and vertex (1, -4)

Worksheet: Using Trans

6-8
12-24 even
26, 27, 28
31, 34, 35

examples

② horizontal translation left 3 units
vertical translation down 1 unit

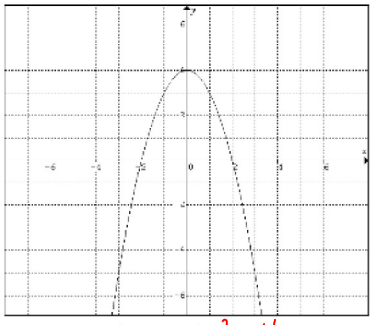
③ vertical stretch by a factor of 3
vertical translation up 1 unit

$a < 0$
reflection over the x-axis

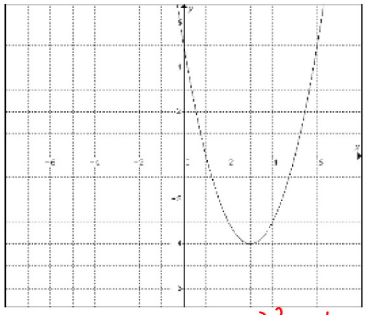
Pre-Calculus 11 Quadratic Functions

Exercise 5 Determining Equations of Quadratic Functions

1.) Determine the equation of the quadratic functions. (follow example 1)

a.) 

$y = -x^2 + 4$

b.) 

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

2.) Determine the equation of a quadratic function congruent to $y = -2x^2$, opening upward with vertex at (1, -3). (follow example 2) $y = 2(x-1)^2 - 3$

3.) Determine the equation of a quadratic function with x-intercepts 1and 3 and vertex at (2, -6). (follow example 3) $y = 6(x-2)^2 - 6$

4.) Convert to standard form: (follow L4, ex 3)

$y = 3x^2 - 12x + 5$ $y = 3(x-2)^2 - 7$

5.) Convert to general form:

$y = 2(x+3)^2 - 7$ $y = 2x^2 + 12x + 11$

$y = 2(x+3)(x+3) - 7$

$y = 2(x^2 + 6x + 9) - 7$

$y = 2x^2 + 12x + 18 - 7$

$y = 2x^2 + 12x + 11$

Extra practice: Pg. 286 #7, 9 Pg. 275 #7