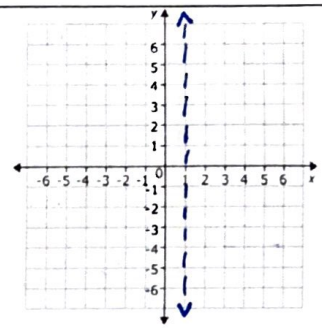
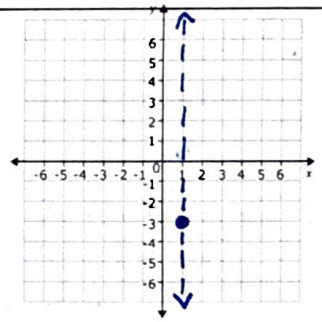
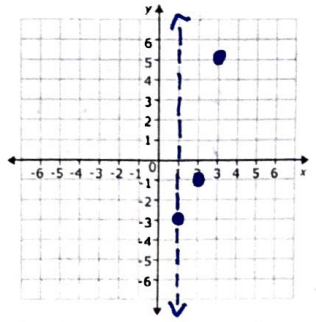
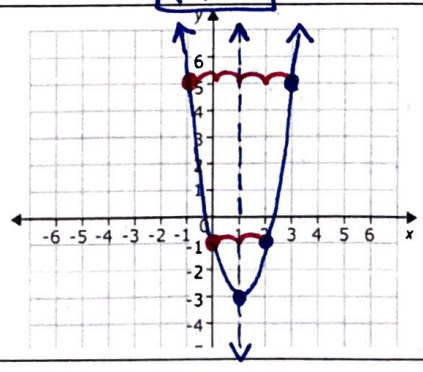
9-2 Graphing Quadratic Functions in STANDARD FORM

$$y = ax^2 + bx + c$$

	Example: $y = 2x^2 - 4x - 1$
STEP 1: Find the Axis of Symmetry (AOS) *Use the formula: $x = \frac{-b}{2a}$	$a=2 \quad b=-4 \quad c=-1$ $x = \frac{-(-4)}{2(2)} = \frac{4}{4} = 1$ 
STEP 2: Find the vertex. Plug in/evaluate the function using the x-value you found in Step 1. (X, Y) (X, ?)	$y = 2x^2 - 4x - 1$ $\quad x=1$ $y = 2(1)^2 - 4(1) - 1$ $y = 2 - 4 - 1$ $y = -3$ $(1, 3)$ 
STEP 3: Graph 2 more points on the same side of the vertex. *Use the vertex/AOS to help you decide which x-values to evaluate. NEXT 2 TO THE RIGHT, OR PREVIOUS 2.	2 AND 3 OR 0 AND -1 $y = 2(2)^2 - 4(2) - 1$ $y = 8 - 8 - 1$ $y = -1$ $\quad (2, -1)$ $y = 2(3)^2 - 4(3) - 1$ $y = 18 - 12 - 1$ $y = 5$ $\quad (3, 5)$ 
STEP 4: Reflect the points from Step 3 across the AOS.	

EXAMPLES:

Graph the functions.

PER. 5 $\frac{\text{SKITTLES}}{1}$ $\frac{\text{S. B}}{1}$

1. $y = x^2 - 8x + 14$

$b = -8$

$x = \frac{-(-8)}{2(1)} = 4$

$y = (4)^2 - 8(4) + 14$

$= 16 - 32 + 14$

$= -2$ VERTEX $\rightarrow (4, -2)$

5 AND 6

$y = (5)^2 - 8(5) + 14$

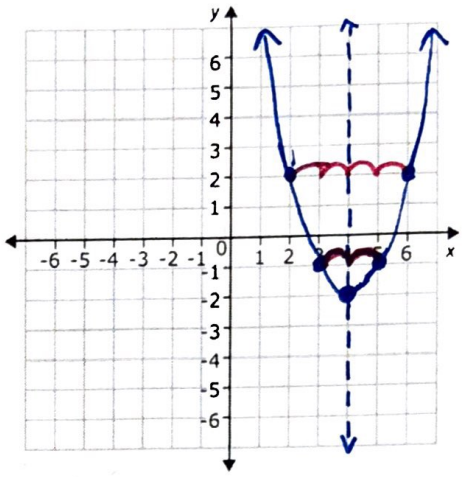
$= 25 - 40 + 14$

$= -1$ $\boxed{(5, -1)}$

$y = (6)^2 - 8(6) + 14$

$= 36 - 48 + 14$

$= 2$ $\boxed{(6, 2)}$



2. $y = 2x^2 - 16x + 31$

$b = -16$

$x = \frac{-(-16)}{2(2)} = 4$

$y = 2(4)^2 - 16(4) + 31$

$= 32 - 64 + 31$

$= -1$ VERTEX $\rightarrow (4, -1)$

2 AND 3

$y = 2(2)^2 - 16(2) + 31$

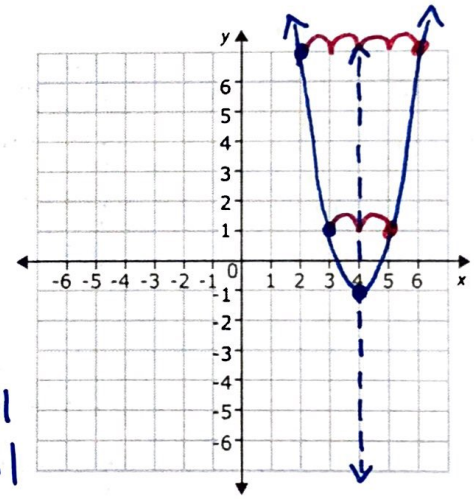
$= 8 - 32 + 31$

$= 7$ $\boxed{(2, 7)}$

$y = 2(3)^2 - 16(3) + 31$

$= 18 - 48 + 31$

$= 1$ $\boxed{(3, 1)}$



3. $\frac{1}{2}x^2 + 4x + 10$

$b = 4$

$x = \frac{-(4)}{2(\frac{1}{2})} = \frac{-4}{1} = -4$

$y = \frac{1}{2}(-4)^2 + 4(-4) + 10$

$= 8 - 16 + 10$

$= 2$ VERTEX $\rightarrow (-4, 2)$

-3 AND -2

$y = \frac{1}{2}(-3)^2 + 4(-3) + 10$

$= \frac{9}{2} - 12 + 10$

$= \frac{5}{2}$ $\boxed{(-3, \frac{5}{2})}$

$y = \frac{1}{2}(-2)^2 + 4(-2) + 10$

$= 2 - 8 + 10$

$= 4$ $\boxed{(-2, 4)}$