# Unit 8 Day 3 Notes on Graphing Quadratics - Vertex Form

Key

Warm it Up!

Describe the transformations being performed on the quadratic parent function. Then, graph the function.

1) $y = -x^2 - 5$ ① reflection over x-axis ② down 5

2) $y = \frac{1}{2}x^2 + 4$ ① vertical shrink by ½ ② up 4
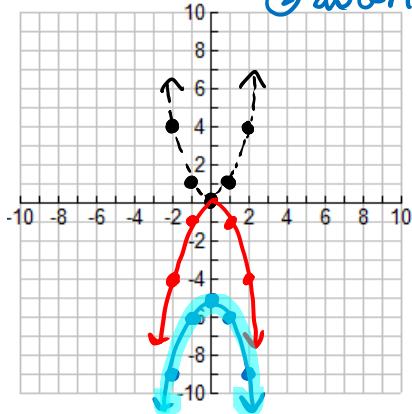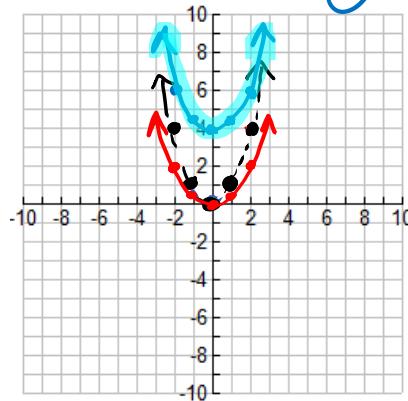
Vertex Form:
$$y = a(x - h)^2 + k$$

Vertex: (h, k) Axis of Symmetry: $x = h$

a: $\begin{cases} \text{positive} \rightarrow \text{OPENS UP} \cup \\ \text{negative} \rightarrow \text{OPENS DOWN} \cap \end{cases}$

Find the vertex and axis of symmetry of the graphs of the following functions.

1. $y = (x + 7)^2 - 1$

VERTEX: $(-7, -1)$

A.O.S.: $x = -7$

2. $y = 3(x - 4)^2 + 6$

VERTEX: $(4, 6)$

A.O.S.: $x = 4$

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

VERTEX: $(-5, 0)$

A.O.S.: $x = -5$

(#4-7) Graph the following quadratic equations in vertex form with at least five accurate points.

4. $y = (x - 3)^2 - 1$ VERTEX: $(3, -1)$, A.O.S.: $x = 3$ OPENS UP

Pattern
1
3
5
7

5. $y = (x - 1)^2 + 1$ VERTEX: $(1, 1)$, A.O.S.: $x = 1$ OPENS UP
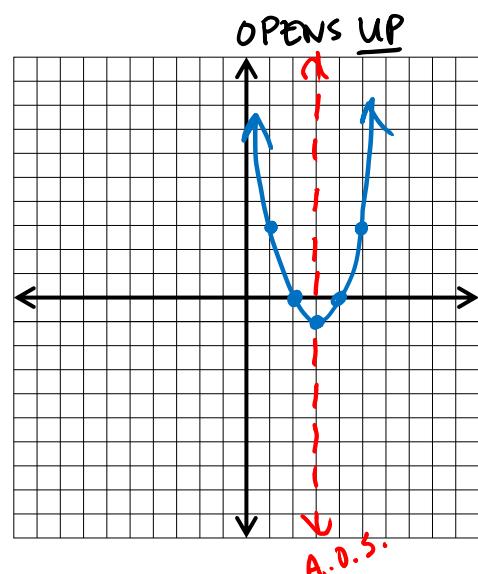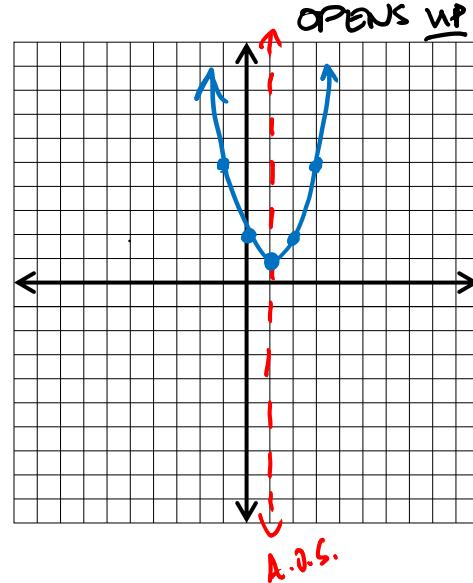
Pattern
1
3
5
7

6. $y = \frac{1}{4}(x+2)^2 + 9$ VERTEX: $(-2, 9)$, A.O.S: $x = -2$ OPENS DOWN

Pattern

1
3
5
7
$\rightarrow$
$\begin{array}{c} -1 \\ -3 \\ -5 \\ -7 \end{array}$

A.O.S.
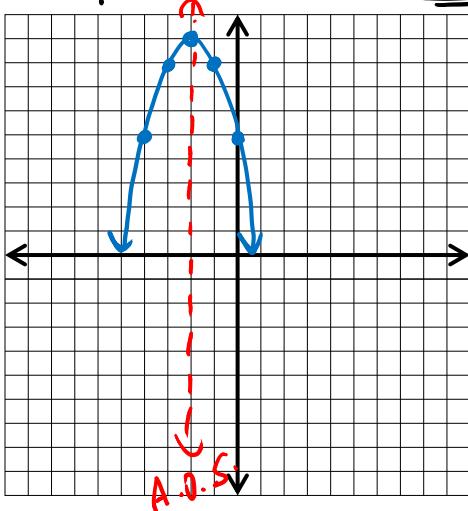
7. $y = 2(x+1)^2 - 8$ VERTEX: $(-1, -8)$, A.O.S: $x = -1$ OPENS UP

Pattern

1
3
5
7
$\rightarrow$
$\begin{array}{c} 2 \\ 6 \\ 10 \\ 14 \end{array}$

A.O.S.
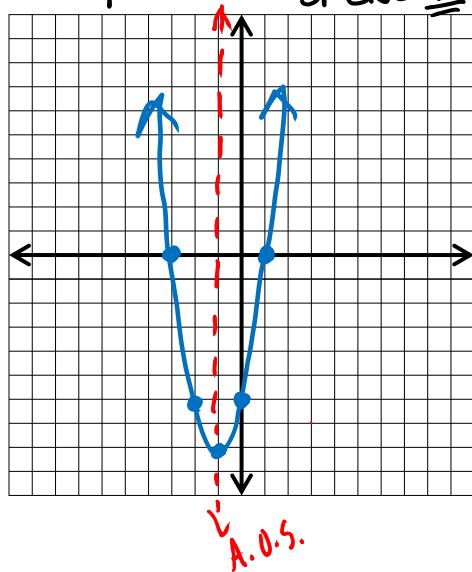
Partner Practice:

8. $y = 3(x-2)^2 - 5$ VERTEX: $(2, -5)$, A.O.S: $x = 2$ OPENS UP

Pattern

1
3
5
7
$\rightarrow$
$\begin{array}{c} 3 \\ 9 \\ 15 \\ 21 \end{array}$

A.O.S.
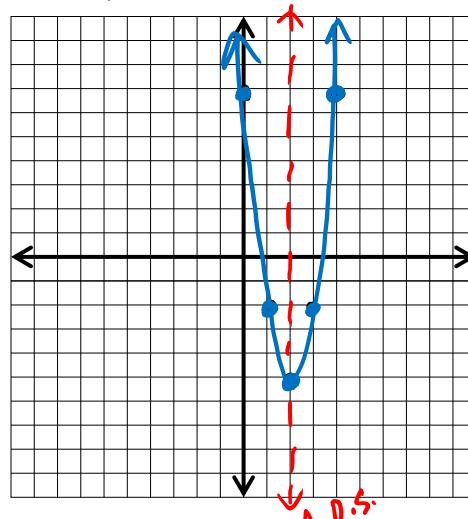
9. $y = -(x-6)^2 + 2$ VERTEX: $(6, 2)$, A.O.S: $x = 6$ OPENS DOWN

Pattern

1
3
5
7
$\rightarrow$
$\begin{array}{c} -1 \\ -3 \\ -5 \\ -7 \end{array}$

A.O.S.
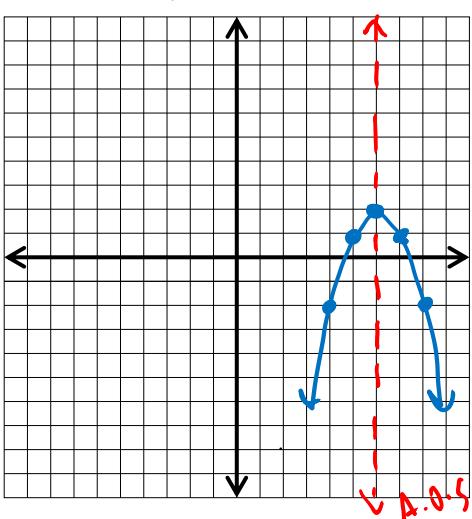
10. $y = \frac{1}{2}(x-4)^2$ VERTEX: $(4, 0)$, A.O.S: $x = 4$ OPENS UP

Pattern

1
3
5
7
$\rightarrow$
$\begin{array}{c} 1/2 \\ 3/2 \\ 5/2 \\ 7/2 \end{array}$

A.O.S.
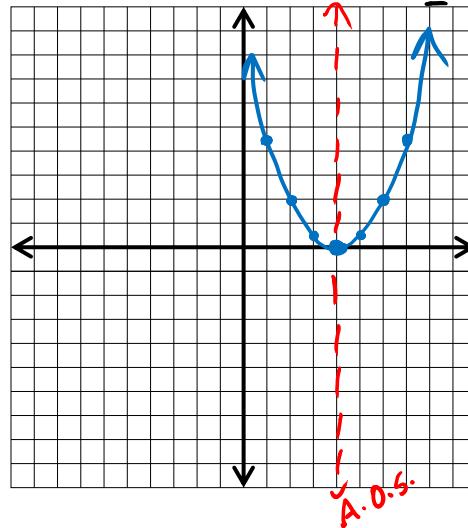
11. $y = -2(x+7)^2 - 5$ VERTEX: $(-7, -5)$, A.O.S: $x = -7$ OPENS DOWN

A.O.S.

Pattern

1
3
5
7
$\rightarrow$
$\begin{array}{c} -1 \\ -3 \\ -5 \\ -7 \end{array}$
$\rightarrow$
$\begin{array}{c} -2 \\ -6 \\ -10 \\ -14 \end{array}$