SC Algebra 1
11.1 Graphing Quadratic Equations

How can I meet today's standards?

*I can **identify the key features of a quadratic function** to graph it.*

Speak Like A Mathematician:

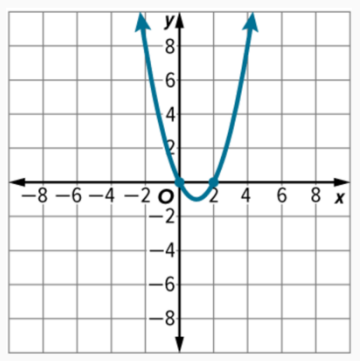
standard form of a quadratic function: a function with an equation in the form _____, where a, b, and c are _____ and $a \neq 0$.

parabola: the graph of a _____ function.

axis of symmetry: a line about which a graph is _____.

Example 1: Identify characteristics: Graph with x-intercepts

Identify the axis of symmetry, the vertex, and the *y*-intercept of the graph. Then describe the end behavior.

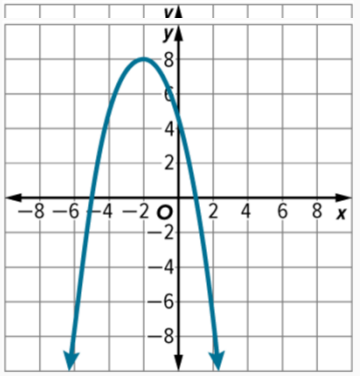


a) axis of symmetry:

vertex:

y-intercept:

end behavior;

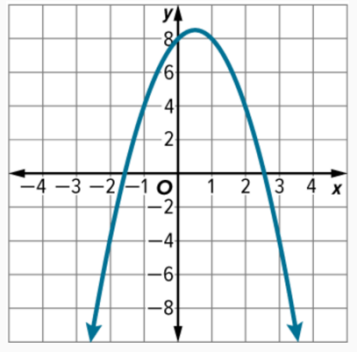


b) axis of symmetry:

vertex:

y-intercept:

end behavior;



c) axis of symmetry:

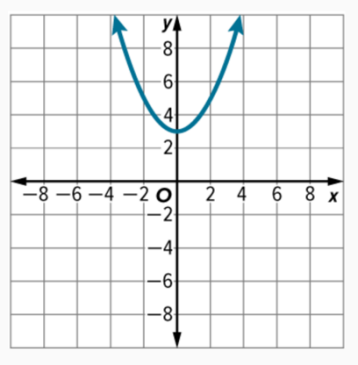
vertex:

y-intercept:

end behavior;

Example 2: Identify characteristics: Graph without x-intercepts

Identify the axis of symmetry, the vertex, and the *y*-intercept of the graph. Then describe the end behavior.

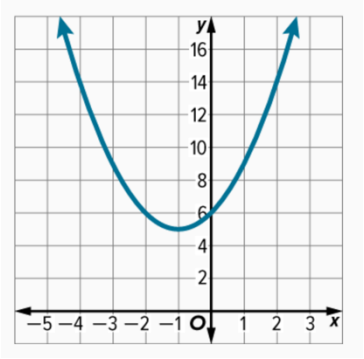


a) axis of symmetry:

vertex:

y-intercept:

end behavior;

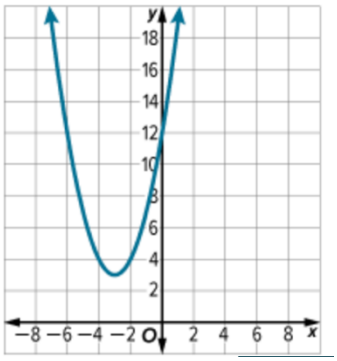


b) axis of symmetry:

vertex:

y-intercept:

end behavior;



c) axis of symmetry:

vertex:

y-intercept:

end behavior;

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Key Concept: Graphing Quadratic Functions

To graph a quadratic function, follow these steps:

- **Step 1: Find the equation of the axis of symmetry.**
- **Step 2: Find the vertex of the parabola and determine whether it is a maximum or minimum.**
- **Step 3: Find the y-intercept by substituting x=0 in the equation.**
- **Step 4: Use symmetry or a table to find additional points, if necessary.**
- **Step 5: Connect all the points with a smooth curve to obtain the graph of the quadratic function.**

Example 3: Graph a Quadratic Function Using Key Features

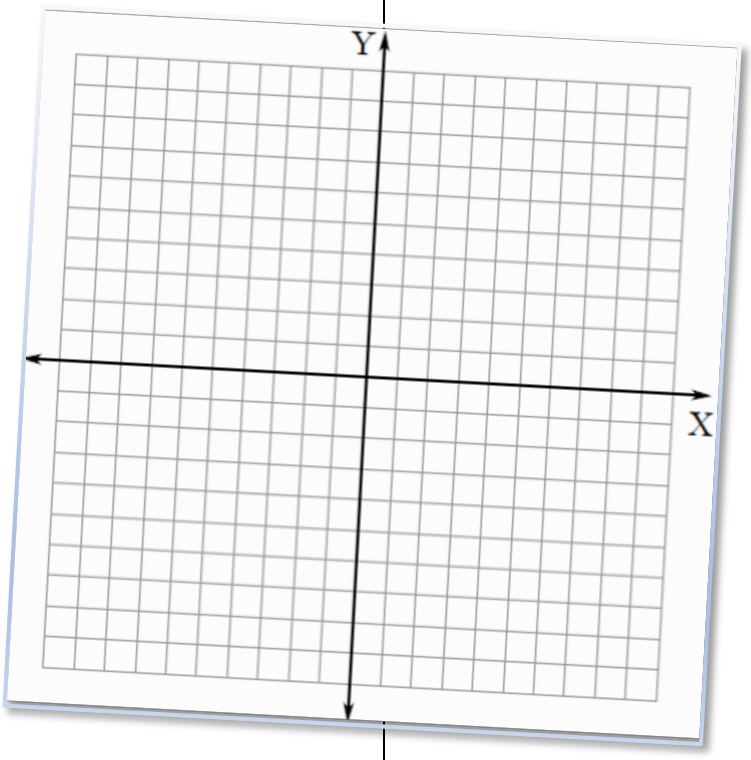
Graph $\boldsymbol{f(x) = x^2 + 2x - 6}$ using key features.

1) Find axis of symmetry

2) Find Vertex:

3) Find y-intercept:

4) Find additional points:



5) Now Plot and Connect Points with a smooth curve.

Example 4: Graph a Quadratic Function Using a Table

Graph $\boldsymbol{f(x) = 2x^2 - 8x + 2}$ using a table.

1) Find the axis of symmetry:

2) Complete the table:

x	0	1	2	3	4
y					

3) Now Plot and Connect Points with a smooth curve.