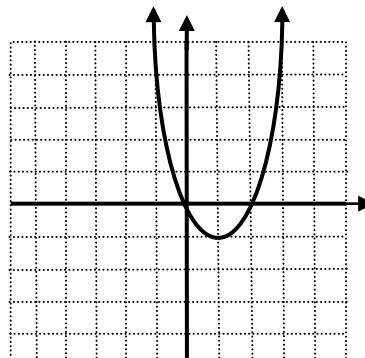
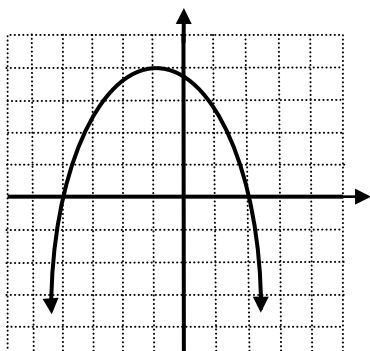


Quadratic Properties

1. Given the following quadratics, label with the correct coordinates and/or determine:

- a) vertex
- b) x-intercepts/zeros
- c) axis of symmetry
- d) optimal value
- e) direction of opening
- f) 2nd differences
- g) maximum/minimum



2. Determine the degree of each relation. Then identify the quadratic relations.

a) $y = 5x - 2$

b) $y = x(x + 4)$

c) $y = x^2 - 6x + 4$

3. Use finite differences to show that the following relations are quadratic. Without graphing, determine whether each function has a minimum or maximum. Explain your reasoning.

a)

x	-3	-2	-1	0
y	2.5	5	6.5	7

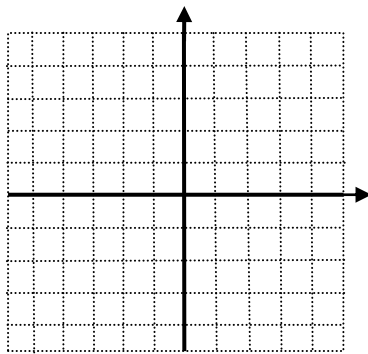
b)

x	-2	-1	0	1	2
y	-3	3	5	3	-3

4. The zeros of a quadratic relation occur at 0 and 6. The second differences are positive.

- a) Is the y-value of the vertex a maximum or minimum value? Explain.
- b) Is the y-value of the vertex a positive or negative value?
- c) Determine the x value of the vertex.

5. Two parabolas have the same x-intercepts at $(-2,0)$ and $(4,0)$. One parabola has a maximum value of 2, the other has a minimum value of -4. Sketch the parabolas on the same axes.



6. Jen knows that $(-1,41)$ and $(5,41)$ lie on a parabola defined by the equation $y = 4x^2 - 16x + 21$. What are the coordinates of the vertex?

7. The zeros of a quadratic relationship are 3 and 7. The optimal value of the relationship is 6.
- Is the optimal value a maximum or a minimum? Explain.
 - Is the y-intercept positive or negative?
 - Are the 2nd differences positive or negative. Explain.
 - What are the coordinates of the vertex?