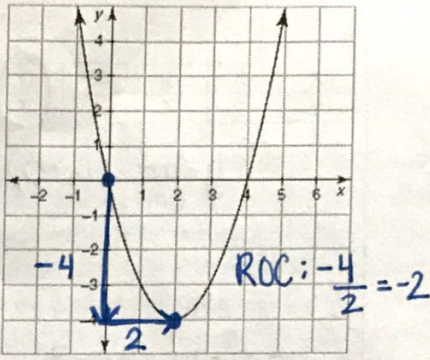
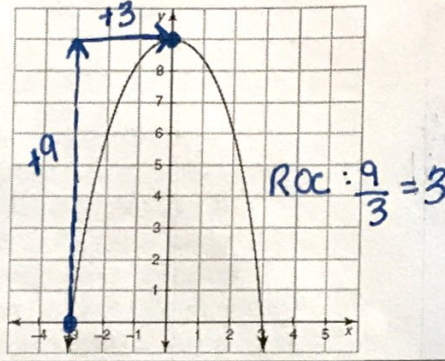


| What you need to know & be able to do | Things to remember | Examples | |
|---|--|---|---|
| <p>1. Find the average rate of change given a graph</p> | <p>-Determine your two x-values and find their corresponding y-values on the parabola.</p> <p>-Calculate the rate of change (rise over run)</p> | <p>a. On interval from $0 \leq x \leq 2$:</p>  | <p>b. On interval from $-3 \leq x \leq 0$:</p>  |
| <p>2. Find the average rate of change given an equation</p> | <p>Find two points (by substituting x-values into the equation to get your y-values.</p> <p>Then use slope formula</p> | <p>a. Calculate the average rate of change for $y = x^2 + 1$ on the interval $0 \leq x \leq 2$.</p> <p>$(0, 1)$ $y = 0^2 + 1$ $y = 1$</p> <p>$(2, 5)$ $y = 2^2 + 1$ $y = 5$</p> <p>$\frac{5-1}{2-0} = \frac{4}{2} = 2$</p> | |
| <p>3. Applications of the Vertex</p> | <p>Maximum/Minimum indicate finding the vertex.</p> <p>Describe what you know about your equation before completing any solving.</p> <p>Interpret the vertex in terms of what x and y represent.</p> | <p>a. The height in feet of a rocket after x second is given by $y = -16x^2 + 128x$. What is the maximum height reached by the rocket and how long does it take to reach that height?</p> <p>$x = \frac{-128}{2(-16)} = \frac{-128}{-32} = 4$</p> <p>$y = -16(4)^2 + 128(4)$ $y = 256$</p> <p>It takes 4 seconds to reach a max height of 256 ft.</p> | <p>b. The arch of bridge is modeled by the equation $y = -\frac{1}{4}(x - 50)^2 + 95$, where x represent the horizontal distance (in feet) and y represents the vertical distance (in feet). What is the maximum height of the arch?</p> <p>Vertex: $(50, 95)$</p> <p>The arch is 95 feet high.</p> |
| | | <p>c. A missile is launched along a path determined by the equation $f(x) = -2x^2 + 72x$, where $f(x)$ is the height of the missile in feet x seconds after the launch. A plane is flying nearby at a height of 650 feet. Is the plane in danger? Why or why not?</p> <p>$x = \frac{-b}{2a} = \frac{-72}{2(-2)} = \frac{-72}{-4} = 18$</p> <p>$y = -2(18)^2 + 72(18)$ $y = 648$</p> <p>The missile will not reach the plane since the missile goes up 648 ft, but the plane is flying at 650 ft.</p> | |

4. Comparing Quadratic Functions

a. Which representation has the greater y-intercept:

A. $y = x^2 + 6x - 2$

y-int (0, -2)

B.

| | | | | | |
|---|----|----|----|----|----|
| X | -3 | -2 | -1 | 0 | 1 |
| Y | -2 | -5 | -6 | -5 | -2 |

y-int (0, -5)

C. $y = (x+3)(x-1)$

$y = x^2 - 1x + 3x - 3$

$y = x^2 + 2x - 3$

y-int (0, -3)

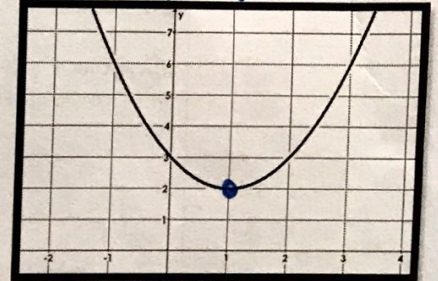
Function A has the greatest y-intercept
(-2 > -3 and -5)

b. What representation has the smallest minimum value?

A. Vertex: (1, -3)

| | | | | |
|---|----|----|----|----|
| X | -1 | 0 | 1 | 2 |
| Y | 1 | -2 | -3 | -2 |

B. Vertex: (1, 2)



C. $y = x^2 - 2x + 6$ Vertex (1, 5)

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

$y = (1)^2 - 2(1) + 6$
 $y = 5$

Function A has the smallest minimum value (-3 < 2 & 5)