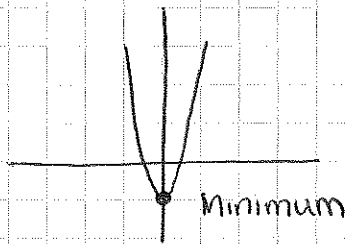


LT 3.3 Graphing Quad. Functions: Max/Min

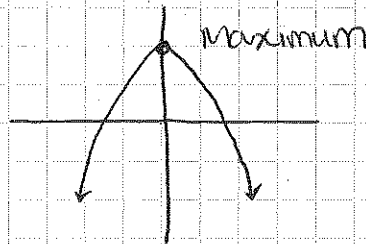
I will be able to...

Max & Min

The y-coordinate of the vertex of a quad. fnc is the maximum value or the minimum value of the function. These represent the greatest or lowest possible values the fnc can reach.



a is positive ☺
 $a > 0$



a is negative ☹
 $a < 0$

The y-coordinate is the max/min value.

Ex 1 a. Determine whether the fnc has a max or min value

$$f(x) = -4x^2 + 12x + 18$$

$a = -4 \rightarrow a < 0$ (negative) ☹ \rightarrow maximum value

b. State the max/min value

Answer: $y = 27$

* The y-coordinate of vertex is max/min

$$x = \frac{-b}{2a} = \frac{-12}{2(-4)} = \frac{12}{8} = \frac{3}{2}$$

vertex: $(\frac{3}{2}, 27)$

$$\begin{aligned} f(\frac{3}{2}) &= -4(\frac{3}{2})^2 + 12(\frac{3}{2}) + 18 \\ &= -4(\frac{9}{4}) + \frac{36}{2} + 18 \\ &= -9 + 18 + 18 \\ &= 9 + 18 = 27 \end{aligned}$$

Ex 2 a) $f(x) = 4x^2 - 24x + 11$
 $a = 4 \rightarrow a > 0$ (+) ☺ \rightarrow Minimum value

b) $x = \frac{-(-24)}{2(4)} = \frac{24}{8} = 3$

vertex: $(3, -25)$

Minimum at $y = -25$

$$\begin{aligned} f(3) &= 4(3)^2 - 24(3) + 11 \\ &= 4(9) - 72 + 11 \\ &= 36 - 72 + 11 = -25 \end{aligned}$$