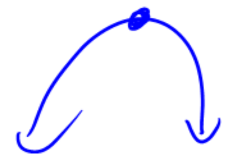
3.2

The maximum/minimum is the y-coordinate of the vertex, or the *k*. A maximum occurs when *a*<0 and a minimum occurs when *a*>0.



Given vertex form:

$$f(x) = a(x - h)^2 + k$$

max/min value!

$$f(x) = -2(x + 5)^2 - 8$$

$a < 0 \therefore$ max

max value of -8

Given Zeros Form:

$$f(x) = a(x - r)(x - s)$$

AoS or $h = \boxed{\frac{r+s}{2}}$

$k = f(h)$

$$f(x) = 3(x+2)(x-8)$$

$r = -2 \quad s = 8$

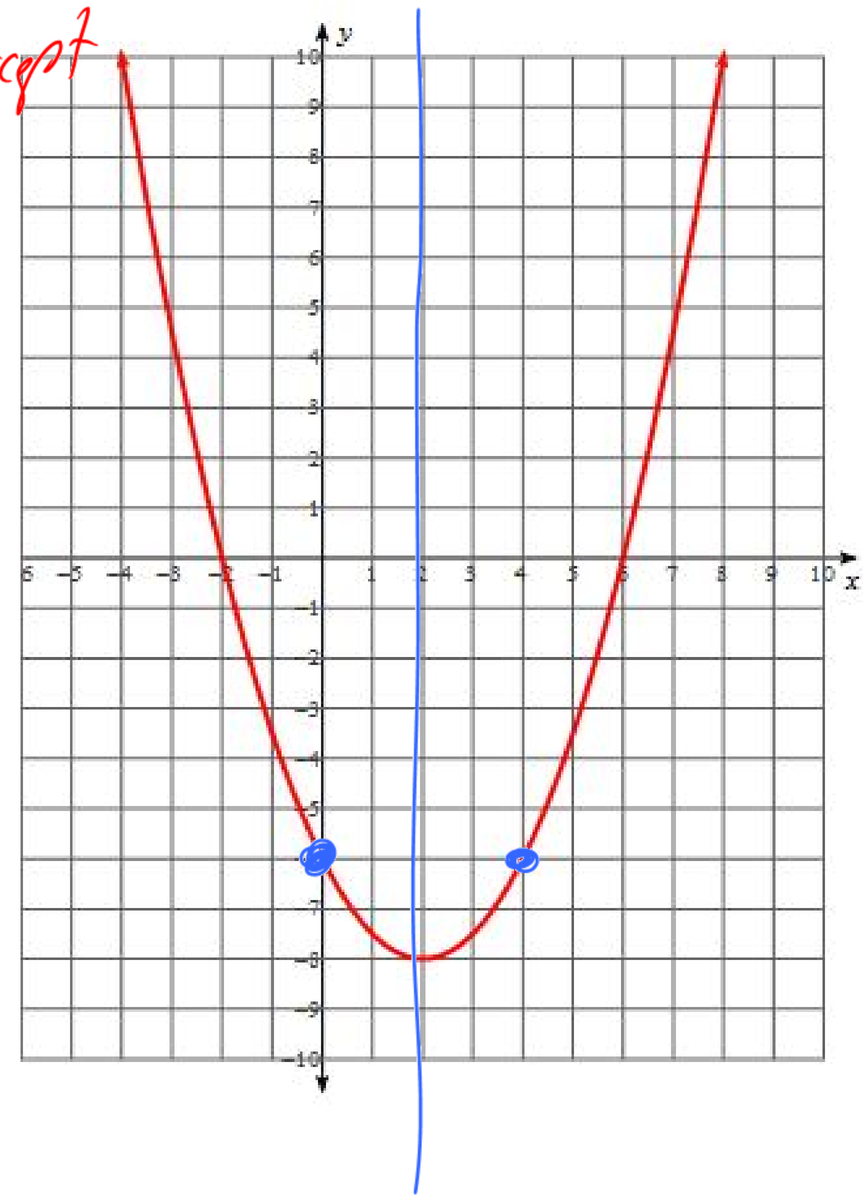
AoS or $h = \frac{-2+8}{2} = \frac{6}{2} = 3$

$$\begin{aligned} k = f(3) &= 3(3+2)(3-8) \\ &= 3(5)(-5) \\ &= -75 \end{aligned}$$

$\therefore$ min of -75

Given Standard Form: $f(x) = ax^2 + bx \boxed{+ c}$

All quadratics have a y-intercept



y-int is $(0, -6)$

the other is $(4, -6)$

$$AoS = \frac{0+4}{2} = \frac{4}{2} = 2$$

ex: $f(x) = \underbrace{2x^2 + 16x}_{\text{Factor } ax} - 3$

Partial Factoring:

$f(x) = \underbrace{2x(x+8)}_{=0} - 3$

$x = 0$ $\quad x = -8$

y-int is $(0, -3)$

symmetric buddy $(-8, -3)$

A.S or $h = \dfrac{0 + -8}{2} = \dfrac{-8}{2} = -4$

$k = f(-4) = 2(-4)^2 + 16(-4) - 3$

$= 32 - 64 - 3$

$= -32 - 3$

$= -35$

$\therefore$ min of -35

vertex $(-4, -35)$