

Warm-up (2.1/2.2 Quiz next Monday)

Find the equation of the parabola given:

a) vertex $(-3, -2)$
passes through $(\frac{1}{2}, 2)$

$$h = -3, k = -2$$

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

$$f(x) = a(x+3)^2 - 2$$

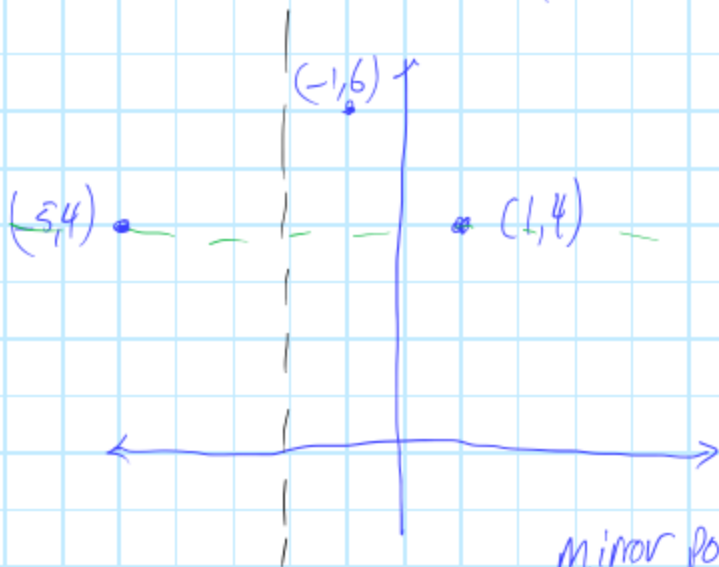
$$f(\frac{1}{2}) = 2 = a(\frac{1}{2}+3)^2 - 2$$

$$4 = a(\frac{7}{2})^2$$

$$\frac{4}{49} \times 4 = \frac{49}{49} a \times \frac{4}{49}$$

$$a = \frac{16}{49}$$

$$f(x) = \frac{16}{49}(x+3)^2 - 2$$

b) passes through
 $(-5, 4)$, $(-1, 6)$, $(1, 4)$ 

$$\begin{aligned} \text{Middle of } (-5, 4) \text{ and } (1, 4) &= \frac{-5+1}{2} = \frac{-4}{2} \\ &= -2 = h \end{aligned}$$

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

Mirror point: $(-5, 4)$

$$f(-5) = 4 = a(-5+2)^2 + k$$

$$4 = 9a + k$$

$$\textcircled{i} \quad 4 - 9a = k$$

Other point: $(-1, 6)$

$$f(-1) = 6 = a(-1+2)^2 + k$$

Other point: $(-1, 6)$

$$f(-1) = 6 = a(-1+2)^2 + k$$

$$6 = 1a + k$$

$$\textcircled{\text{ii}} \quad 6 - a = k$$

$$\textcircled{\text{i}} = \textcircled{\text{ii}} \Rightarrow 4 - 9a = 6 - a$$

$$-2 = 8a$$

$$\underline{-\frac{1}{4} = a}$$

$$\textcircled{\text{i}} \Rightarrow 4 - 9\left(-\frac{1}{4}\right) = k$$

$$4 + \frac{9}{4} = k$$

$$\frac{16}{4} + \frac{9}{4} = k$$

$$\underline{\frac{25}{4} = k}$$

$$f(x) = -\frac{1}{4}(x+2)^2 + \frac{25}{4}$$