

## U2 Day 8 HW - Finding the Equation of a Parabola from Focus and Directrix KEY

1. Find the standard form quadratic equation given the focus and directrix. **Show all your work.**

a) focus:  $(-3, 4)$  directrix:  $y = 2$  (no real zeros)

$$y = \frac{1}{4}x^2 + \frac{3}{2}x + \frac{21}{4}$$

b) focus:  $(5, -1)$  directrix:  $y = -4$

$$y = \frac{1}{6}x^2 - \frac{5}{3}x + \frac{5}{3}$$

c) focus:  $(-2, 7)$  directrix:  $y = 4$  (no real zeros)

$$y = \frac{1}{6}x^2 + \frac{2}{3}x + \frac{37}{6}$$

d) focus:  $(4, -5)$  directrix:  $y = -9$

$$y = \frac{1}{8}x^2 - x - 5$$

2. Check your standard form equation with the key and then use  $p$  or  $-b/2a$  to find the vertex coordinates. Then write the quadratic in vertex form.

a) vertex:  $(-3, 3)$  vertex form:  $y = \frac{1}{4}(x+3)^2 + 3$

b) vertex:  $(5, -2.5)$  vertex form:  $y = \frac{1}{6}(x-5)^2 - 2.5$

c) vertex:  $(-2, 5.5)$  vertex form:  $y = \frac{1}{6}(x+2)^2 + 5.5$

d) vertex: vertex form:  $y =$

3. Find the **real** zeros of **ONE** quadratic (your choice) using the quadratic formula. **Show all your work.**

Then use "inside opposite" to write the factored form of the equation.

1. b) zeros:  $5 \pm 3\sqrt{5/3}$  factored form:  $y = (x - 5 + 3\sqrt{5/3})(x - 5 - 3\sqrt{5/3})$

d)  $4 \pm 4\sqrt{7/2}$   $y = (x - 4 + 4\sqrt{7/2})(x - 4 - 4\sqrt{7/2})$