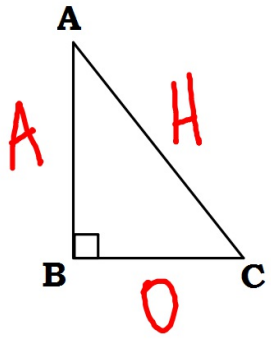
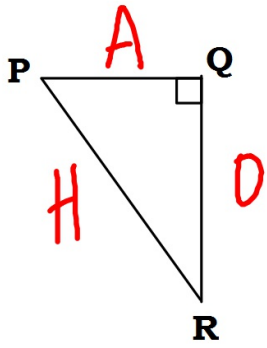
Spiral Review:

1. Use the right triangle to the right, label the side opposite <A with an "O", the side adjacent to <A with an "A", and the hypotenuse with a "H".



2. Use the right triangle to the right, label the side opposite <P with an "O", the side adjacent to <P with an "A", and the hypotenuse with a "H".



HWQ: Parabolas (Day 1)

Write the standard form of the parabola.

1.) focus: (0,4)
vertex: (0,0)

2. directrix: $y = 5$
vertex: (0,0)

Find the vertex, focus, and the directrix.

3. $y^2 + 6y + 8x + 25 = 0$

p.636 9.1 Parabolas (Day 2)

$(x - h)^2 = 4p(y - k)$

*opens up or down
directrix: $y = k - p$
focus: $(h, k+p)$
vertex: (h, k)

$(y - k)^2 = 4p(x - h)$

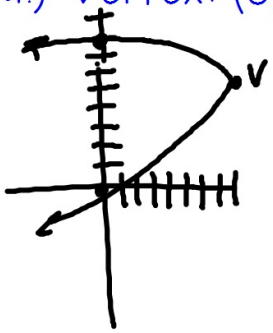
*opens left or right
directrix: $x = h - p$
focus: $(h+p, k)$
vertex: (h, k)

Students will be able to find the standard form of the equation of the parabola.

Example 1: Find the standard form of the equation of the parabola with the given characteristics.

a.) vertex: (8,4); passes through points (0,8) and (0,0)

h k x y



$(y-k)^2=4p(x-h)$

$(0-4)^2=4p(0-8)$

$(-4)^2=4p(-8)$

$\frac{16}{-32}=\frac{-32p}{-32}$

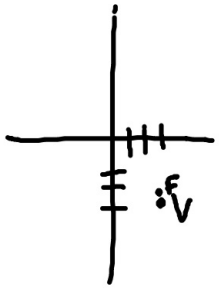
$p=-\frac{1}{2}$

$(y-4)^2=4(-\frac{1}{2})(x-8)$

$(y-4)^2=-2(x-8)$

Students will be able to find the standard form of the equation of the parabola.

b.) vertex: (3,-3); focus (3, -9/4)



UP $(x-h)^2 = 4p(y-k)$

$(x-3)^2 = 4\left(\frac{3}{4}\right)(y-3)$

$\boxed{(x-3)^2 = 3(y+3)}$

focus: $(h, k+p)$

$(3, -3+p)$

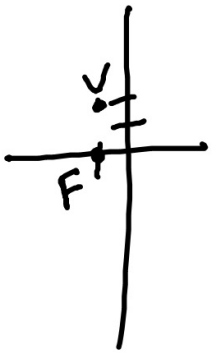
$-3+p = -\frac{9}{4}$

$+3 \qquad +3$

$p = \frac{3}{4}$

Students will be able to find the standard form of the equation of the parabola.

c.) vertex: (-1,2); focus: (-1,0)



$(x-(-1))^2 = 4\cdot -2(y-2)$

$\boxed{(x+1)^2 = -8(y-2)}$

focus: $(h, k+p)$

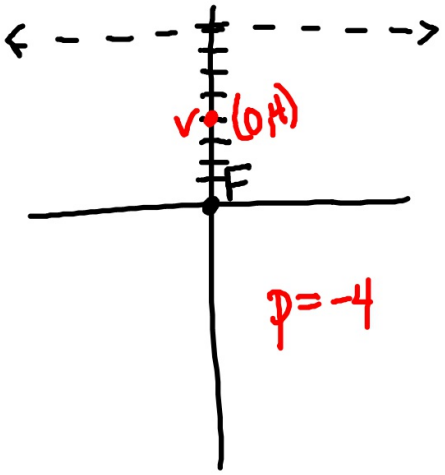
$(-1, 2+p)$

$2+p=0$

$p=-2$

Students will be able to find the standard form of the equation of the parabola.

d.) focus: (0,0); directrix: $y = 8$



$(x-h)^2 = 4p(y-k)$

$(x-0)^2 = 4 \cdot -4(y-4)$

$x^2 = -16(y-4)$

Students will be able to solve applied problems involving parabolas.

Example 2: Applications

a.) A parabolic lattice arch is 8 feet high at the vertex. At a height of 4 feet, the width of the lattice is 4 feet. How wide is the lattice arch at ground level?

vertex (0,8)

$(x-h)^2 = 4p(y-k)$

$(2-0)^2 = 4p(4-8)$

$4 = 4p(-4)$

$4 = -16p$

$p = -\frac{1}{4}$

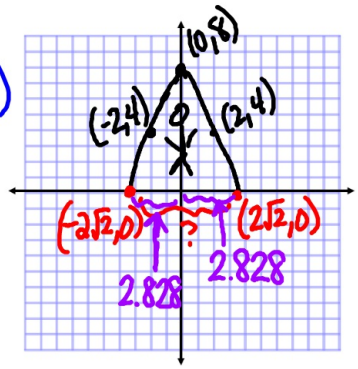
$(x-0)^2 = 4 \cdot -\frac{1}{4}(y-8)$

$x^2 = -(y-8)$

$x^2 = -(0-8)$

$\sqrt{x^2} = \sqrt{8}$

$x = \pm 2\sqrt{2}$



Width = 2.828 + 2.828

Width = 5.656 ft

Students will be able to solve applied problems involving parabolas.

p.645 #102 – see picture in book

b.) Roads are often designed with parabolic surfaces to allow for rain to drain off. A particular road is 32 feet wide is 0.4 foot highter in the center than it is on the sides.

vertex: (0,0) points (-16,-.4) (16,-.4)

a.) Find an equation if the parabola with its vertex at the origin that models the road surface.

$(16-0)^2 = 4p(-.4-0)$

$256 = -1.6p$

$p = -160$

$(x-0)^2 = 4(-160)(y-0)$

$\boxed{x^2 = -640y}$

b.) How far from the center of the road is the road surface 0.1 foot lower than the middle.

$x^2 = -640y$

$x^2 = -640(-.1)$

$\sqrt{x^2} = \sqrt{64}$

$x = \pm 8$

$\boxed{8 \text{ feet}}$

Turn-in: p.644 (82, 100)

HW: p.644 (79-89, 97-103 odds)