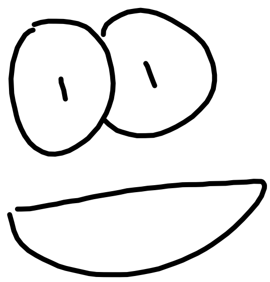
Warm-Up

February 6, 2017

Convert to transformational form.

$$15y^2+x-210y+675=0$$
$$-x \qquad -675 \qquad -675\ -x$$
$$15y^2-210y=-x-675$$
$$15(y^2-14y+\boxed{49})=-x-675+15\boxed{49}$$
$$15(y-7)^2=-x-675+735$$
$$15(y-7)^2=-x+60$$
$$\frac{\cancel{15}(y-7)^2}{\cancel{15}}=\frac{-1(x-60)}{15}$$
$$(y-7)^2=\frac{-1}{15}(x-60)$$

$$15y^2 + x - 210y + 675 = 0$$
$$-x \qquad -675$$
$$15y^2 - 210y = -675 - x$$
$$15(y^2 - 14y) = -675 - x$$
$$15(y^2 - 14y + \boxed{49}) = -675 - x + 15\boxed{49}$$
$$15(y-7)^2 = 60 - x$$
$$\frac{15(y-7)^2}{15} = \frac{-1(x-60)}{15}$$
$$(y-7)^2 = -1/15(x-60)$$



$$100x^2+100y^2-100x+240y-56=0$$

Step 1: Move constants and whatever letter isn't squared to one side.

Step 2: Factor out coefficient of squared term. Add yo' box.

Step 3: Half and square middle term.

Step 4: Factor out coefficient of unsquared term.

Step 5: Divide both sides by coefficient of squared binomial.

$$100x^2+100y^2-100x+240y-56=0$$

$$+56 \quad +56$$

$$100x^2+100y^2-100x+\frac{240}{100}y=56$$

$$100\left(x^2-1x+\boxed{\tfrac{1}{4}}\right)+100\left(y^2+\tfrac{12}{5}y+\boxed{\tfrac{144}{100}}\right)=56+100\boxed{\tfrac{1}{4}}+\cancel{100}\boxed{\tfrac{144}{100}}$$

$$100\left(x-\tfrac{1}{2}\right)^2+100\left(y+\tfrac{12}{10}\right)^2=56+25+144$$

$$\frac{100\left(x-\frac{1}{2}\right)^2}{100}+\frac{100\left(y+\frac{12}{10}\right)^2}{100}=\frac{225}{100}$$

$$\left(x-\tfrac{1}{2}\right)^2+\left(y+\tfrac{6}{5}\right)^2=\frac{9}{4}$$

$$100x^2+100y^2-100x+240y-56=0$$

$$+56 \qquad +56$$

$$100x^2+100y^2-100x+\frac{240}{100}y=56$$

$$100\left(x^2-1x+\boxed{\tfrac{1}{4}}\right)+100\left(y^2+\frac{12}{5}+\frac{144}{100}\right)=56+100\boxed{\tfrac{1}{4}}+100\frac{144}{100}$$

$$100\left(x-\frac{1}{2}\right)^2+100\left(y+\frac{12}{10}\right)^2=56+25+144$$

$$\frac{100\left(x-\frac{1}{2}\right)^2}{100}+\frac{100\left(y+\frac{12}{10}\right)^2}{100}=\frac{225}{100}$$

$$\left(x-\frac{1}{2}\right)^2+\left(y+\frac{6}{5}\right)^2=\frac{9}{4}$$

Step 1: Move constants and whatever letter isn't squared to one side.

Step 2: Factor out coefficient of squared term. Add yo' box.

Step 3: Half and square middle term.

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Step 5: Divide both sides by coefficient of squared binomial.

$$100x^2 + 100y^2 - 100x + 240y - 56 = 0$$
$$+56 \quad +56$$

$$\frac{100}{100}x^2 + \frac{100}{100}y^2 - \frac{100}{100}x + \frac{240}{100}y = 56$$

$$100\left(x^2 - 1x + \boxed{\tfrac{1}{4}}\right) + 100\left(y^2 + \tfrac{12}{5}y + \boxed{\tfrac{144}{100}}\right) = 56 + 100\boxed{\tfrac{1}{4}} + 100\boxed{\tfrac{144}{100}}$$

$$56 + 25 + 144$$

$$\frac{100\left(x - \frac{1}{2}\right)^2}{100} + \frac{100\left(y + \frac{12}{10}\right)^2}{100} = \frac{225}{100}$$

$$\left(x - \tfrac{1}{2}\right)^2 + \left(y + \tfrac{6}{5}\right)^2 = \frac{9}{4}$$

Equation	Vertex	Axis of Symmetry
$(y-k)^2 = 4p(x-h)$	(h, k)	Horizontal
$(x-h)^2 = 4p(y-k)$	(h, k)	Vertical

Transformational Form

$$\frac{(x-h)^2}{4p} = \frac{4p(y-k)}{4p}$$

$$\frac{1}{4p}(x-h)^2 = y-k$$

$+k \qquad +k$

$$y = \frac{1}{4p}(x-h)^2 + k$$

Vertex

Focus

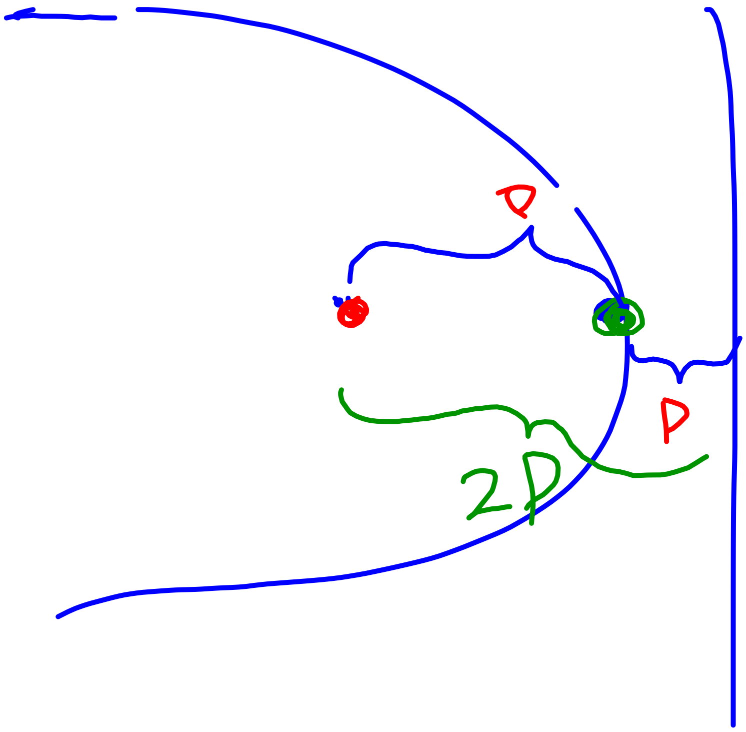
Directrix

Opp Same

$$x = \frac{1}{4p}(y-k)+h$$

Vertex Form

Focus	Directrix	Description
$(h + p, k)$	$x = h - p$	If $p > 0$, opens to the right. If $p < 0$, opens to the left.
$(h, k + p)$	$y = k - p$	If $p > 0$, opens upward. If $p < 0$, opens downward.



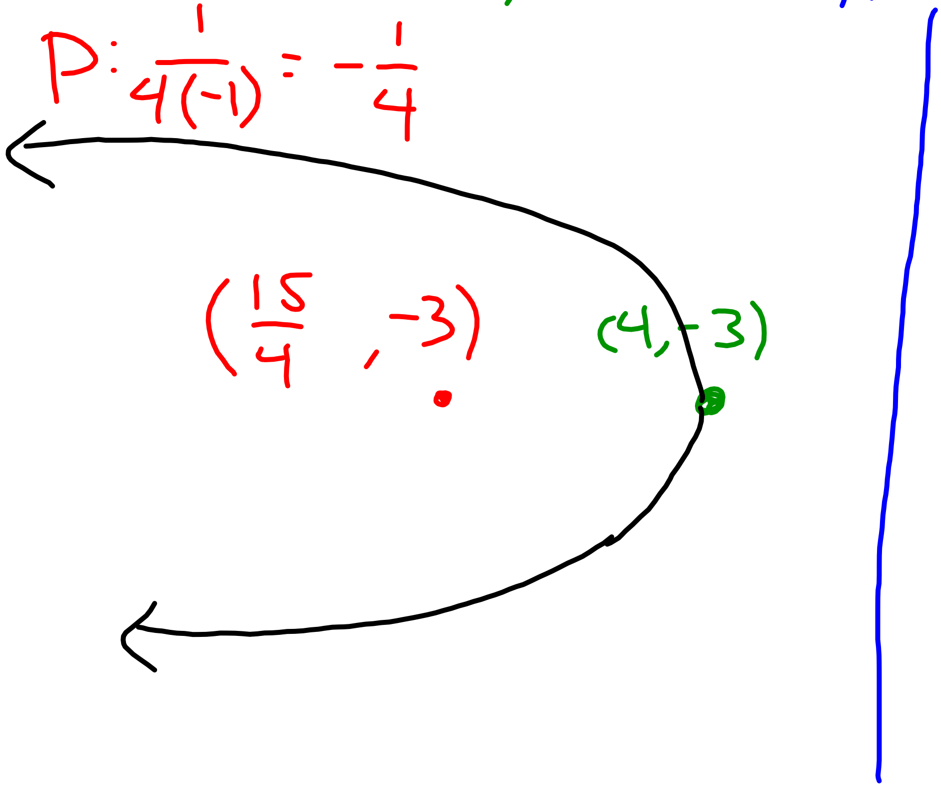
10. $x = \overset{a}{(-1)}(y+3)^2 + 4$ $P = \frac{1}{4a}$

$x = \frac{1}{4p}(y-k)^2 + h$

vertex: $(4, -3)$

$P: \frac{1}{4(-1)} = -\frac{1}{4}$

$x = 4 - -\frac{1}{4} = \frac{17}{4}$



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

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

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

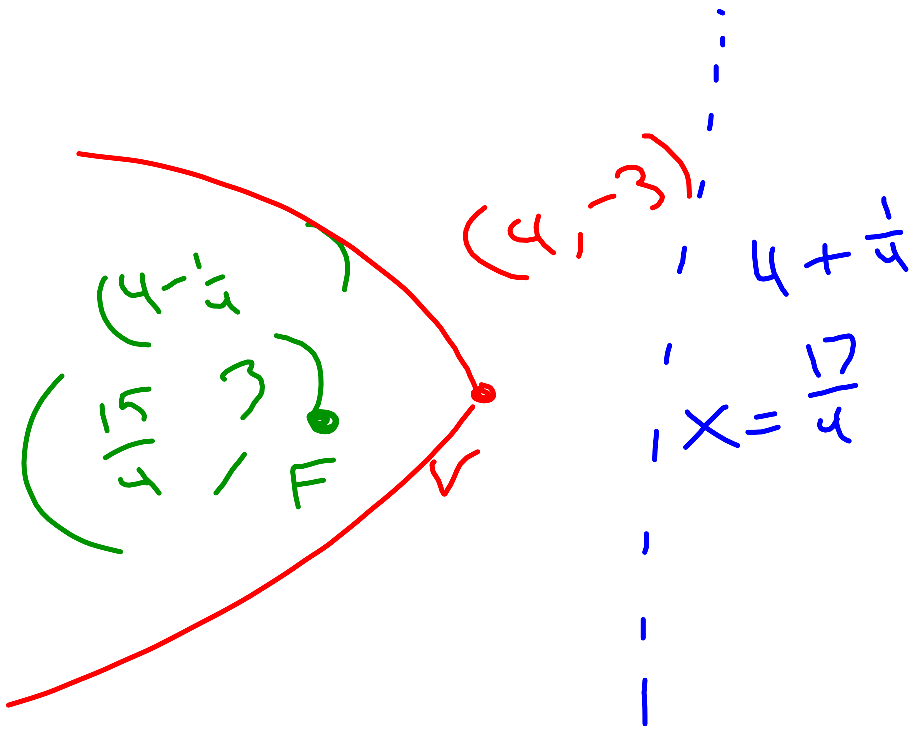
$x = \frac{1}{4p}(y-k)^2 + h$

10. $x = -(y+3)^2 + 4$

vertex: $(4, -3)$

p: $\frac{1}{4p} = -1$ $\quad 1 = -4p \rightarrow p = -\frac{1}{4}$

open to left



10 $x = -(y+3)^2 + 4$

opens ______

vertex: ______

$P =$ ______

focus: ______

Directrix: ______