Parabolas

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Glue your parabola foldable on this page.

Fold in 1/2 & write the following on it:

$(x - h)^2 = +4p(y - k)$ x^2 & +p opens up

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

$(y - k)^2 = +4p(x - h)$ y^2 & +p opens right

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

Aug 10-4:19 PM

Parabolas

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Graph & state the vertex, focus & directrix.

1. $(x + 4)^2 = 12 (y - 1)$

direction of opening: up bc x^2 positive +p

vertex: (-4, 1)

focus: (-4, 4)

directrix: y = -2

4p=12 p=3

1. Plot the vertex (h,k)
2. Use p to count inside from vertex to find the focus
3. Use p to count outside from vertex to find the directrix
4. The width of the parabola is 4p through the focus

2. $(y - 3)^2 = -8 (x + 4)$

direction of opening: left; bc y^2 + -p

vertex: (-4, 3)

focus: (-6, 3)

directrix: x = -2

4p=-8 p=-2

Oct 23-11:10 AM

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3. Write in standard form & state vertex, focus & directrix.

$8x = y^2 - 10y - 39$

$+39 \quad +39$

$8x + 39 + 25 = y^2 - 10y + 25$

- move 'c' to the side with the variable that isn't squared
- complete the square $\left(\frac{b}{2}\right)^2$
- rewrite as a (binomial)^2
- factor out leading coefficient

$\left(\frac{-10}{2}\right)^2 = (-5)^2$

$8x + 64 = (y-5)^2$

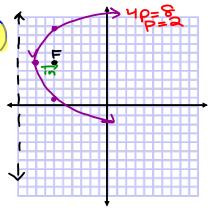
$8(x+8) = (y-5)^2$

$(y-5)^2 = 8(x+8)$ or $4p$

$k \quad h$

$4p = 8$

$p = 2$



open right

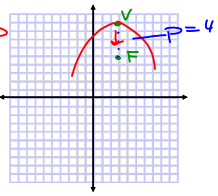
Vertex: $(-8, 5)$

focus: $(-6, 5)$

directrix: $x = -10$

4. Find the equation of the parabola with a vertex $(3, 9)$ & focus $(3, 5)$.

$h \quad k$



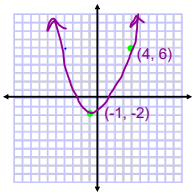
opens ↓ so $x^2 = -p$

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

$(x-3)^2 = -4 \cdot 4(y-9)$

$(x-3)^2 = -16(y-9)$

5. Find the equation of the parabola given its graph.



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