

# Parabolas - Graphing Notes

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| <b>Parabolas – Graphing</b> | <div style="text-align: center;"> <b>Parabola</b><br/>                 Every parabola has the property that any point on its graph is equidistant from a point called the focus and a line called the directrix.             </div> |
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**Vertical Parabola**

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

$+4p$  up  
 $-4p$  down

$p$  = distance from vertex to focus and vertex to directrix

$4p$  = width of the parabola through the focus  
 ↳ LR = "latus rectum"

**Horizontal Parabola**

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

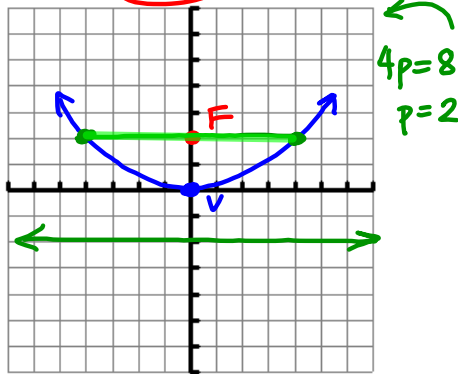
$+4p$  right  
 $-4p$  left

# Parabolas - Graphing Notes

Example 1: *vertical*

$$x^2 = 8y$$

*+8 up*



vertex (0,0)

focus (0,2)

directrix = y = -2

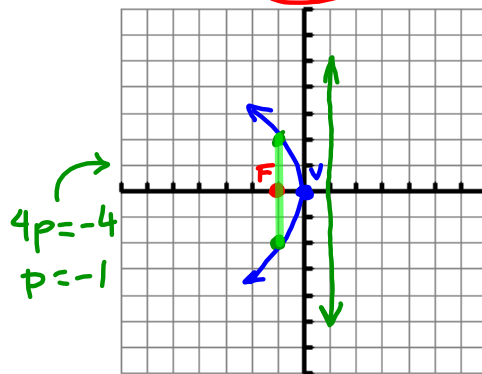
ends of LR = (-4,2)(4,2)

length of LR = 8

Example 2: *horizontal*

$$y^2 = -4x$$

*-4 left*



vertex (0,0)

focus (-1,0)

directrix = x = 1

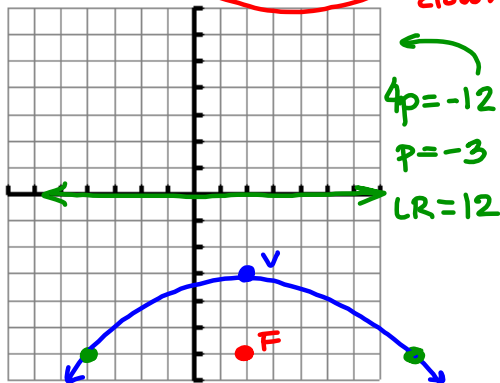
ends of LR = (-1,2)(-1,-2)

length of LR = 4

Example 3: *vertical*

$$(x-2)^2 = -12(y+3)$$

*-12 down*



vertex (2,-3)

focus (2,-6)

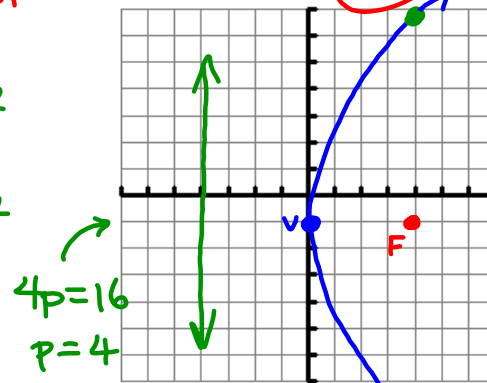
directrix = y = 0

ends of LR = (-4,-6)(8,-6)

Example 4: *horizontal*

$$(y+1)^2 = 16x$$

*right*



vertex (0,-1)

focus (4,-1)

directrix = x = -4

ends of LR = (4,7)(4,-9)