

Sect. 10. - The Parabola

A parabola is the locus of all points in a given plane that are the same distance from a given point, called the focus, and a given line, called the directrix.

Every parabola has an axis of symmetry which is perpendicular to the directrix and intersects the parabola at its vertex.

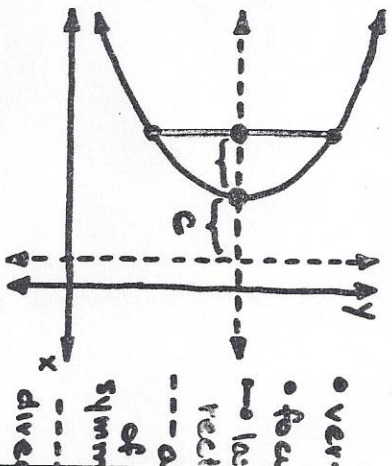
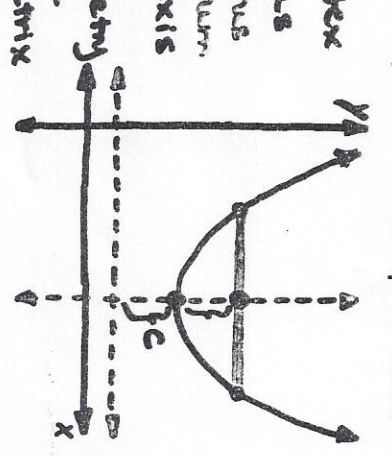
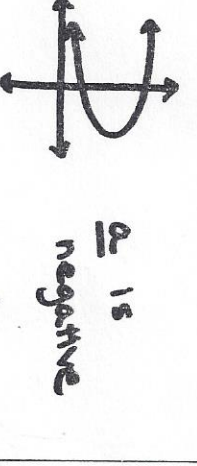



The line segment that passes through the focus of the parabola and is perpendicular to its axis of symmetry is called the latus rectum. Its endpoints lie on the parabola.

c = the distance from the vertex to the focus and to the directrix

$\left| \frac{1}{a} \right|$ = the length of the latus rectum

The relationship between a and c is

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

HORIZONTAL PARABOLA	VERTICAL PARABOLA
<p>opens either left or right</p> 	<p>opens either up or down</p> 
<p>vertex (h, k)</p> <p>equation - axis of symmetry $x - h = a(y - k)^2$ (it's horizontal)</p>  <p>a is positive</p>  <p>a is negative</p>	<p>vertex (h, k)</p> <p>equation - axis of symmetry $y - k = a(x - h)^2$ (it's vertical)</p>  <p>a is positive</p>  <p>a is negative</p>

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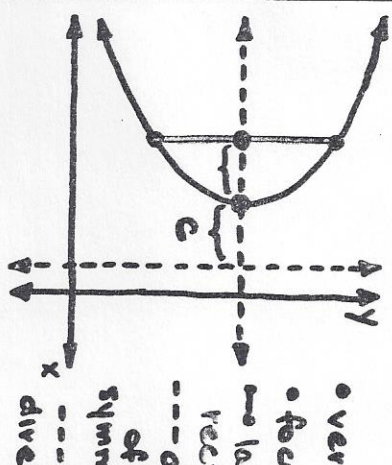
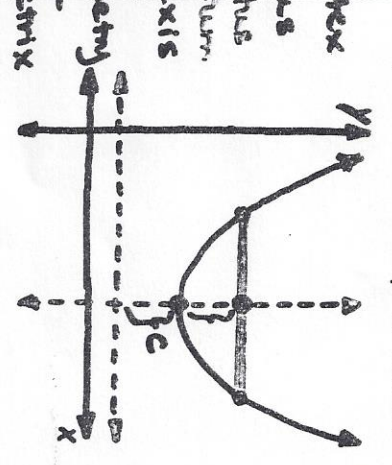
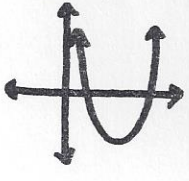
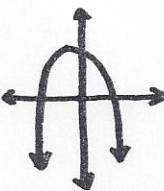
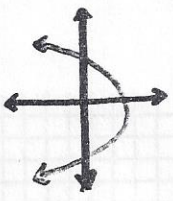
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<p>opens either left or right</p>  <ul style="list-style-type: none"> • vertex • focus --- latus rectum --- axis of symmetry --- directrix 	<p>opens either up or down</p>  <ul style="list-style-type: none"> • vertex • focus --- latus rectum --- axis of symmetry --- directrix
<p>vertex (h, k)</p> <p>equation - axis of symmetry $y = k$ (it's horizontal)</p> <p>$x - h = a(y - k)^2$</p>	<p>vertex (h, k)</p> <p>equation - axis of symmetry $x = h$ (it's vertical)</p> <p>$y - k = a(x - h)^2$</p>
<p>a is positive</p>  <p>a is negative</p> 	<p>a is positive</p>  <p>a is negative</p> 