General Parabolas

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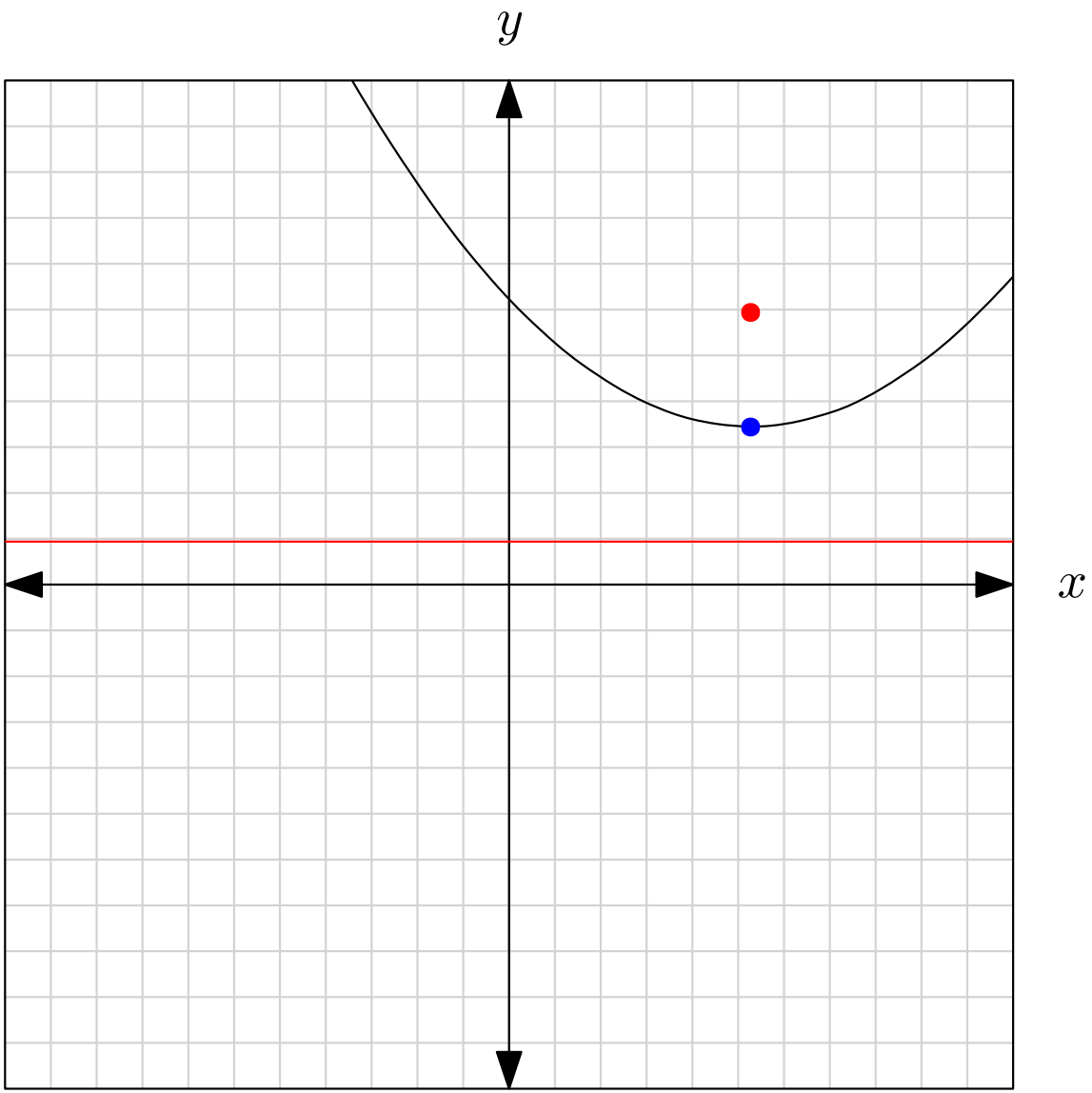
Announcements

1. Homework in MyOpenMath due tonight.
2. Exam next week (old exam available in Canvas).
3. Friday's class will be on Thursday this week.

General Parabolas

Let's work out the formula for a general parabola with a vertex at (h, k).



General Parabolas

Some Information

STANDARD FORMS OF PARABOLAS WITH VERTEX (*H*, *K*)

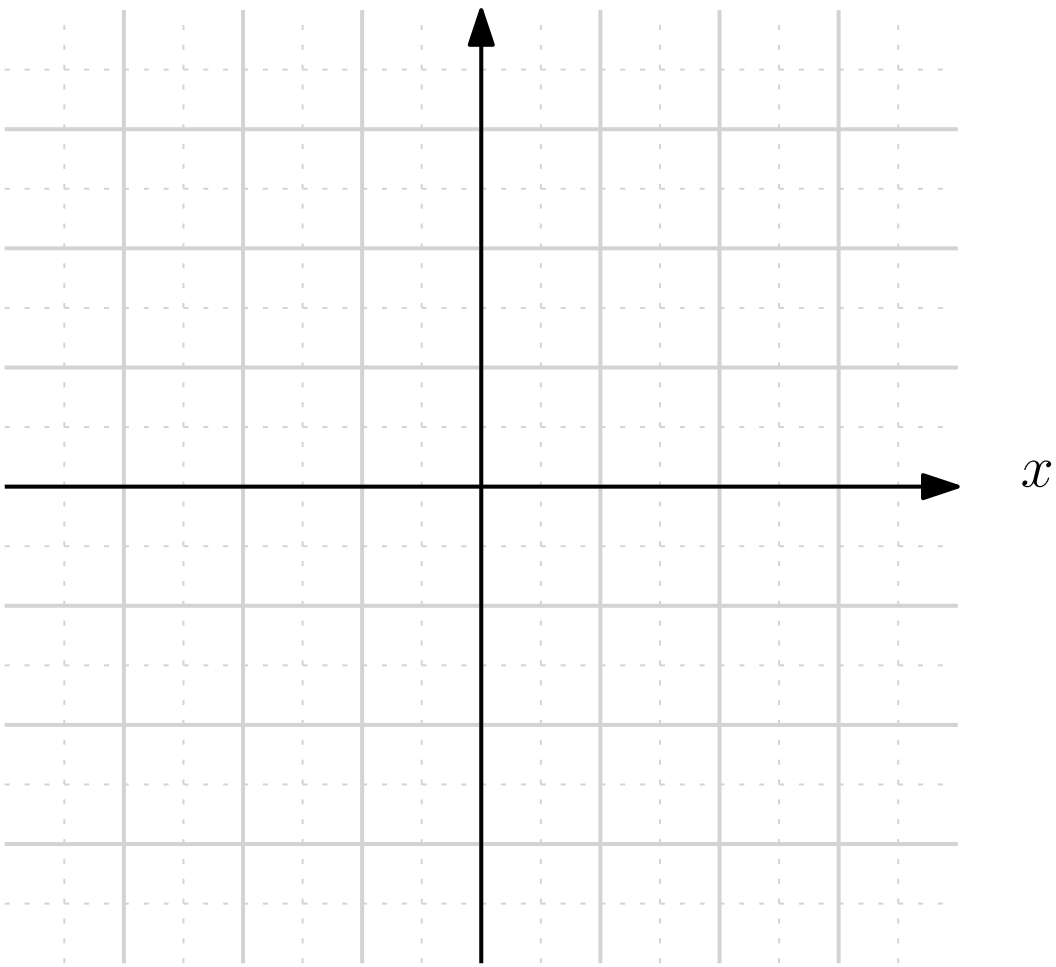
Table 2 and Figure 9 summarize the standard features of parabolas with a vertex at a point (h, k) .

Axis of Symmetry	Equation	Focus	Directrix	Endpoints of Latus Rectum
$y = k$	$(y-k)^2 = 4p(x-h)$	$(h+p,\ \ k)$	$x = h-p$	$(h+p,\ \ k \pm 2p)$
$x = h$	$(x-h)^2 = 4p(y-k)$	$(h,\ \ k+p)$	$y = k-p$	$(h \pm 2p,\ \ k+p)$

Table 2

Example

Write the equation and graph a parabola that has a focus at $(1, 3)$ and a directrix of $y = -1$.



Example

What are the focus, directrix and vertex for the parabola with equation

$$y = \frac{x^2}{4} + \frac{5x}{2} + \frac{13}{4}?$$

Applications of Parabolas

Example

EXAMPLE 6

Solving Applied Problems Involving Parabolas

A cross-section of a design for a travel-sized solar fire starter is shown in Figure 13. The sun's rays reflect off the parabolic mirror toward an object attached to the igniter. Because the igniter is located at the focus of the parabola, the reflected rays cause the object to burn in just seconds.

- ⓐ Find the equation of the parabola that models the fire starter. Assume that the vertex of the parabolic mirror is the origin of the coordinate plane.
- ⓑ Use the equation found in part ⓐ to find the depth of the fire starter.

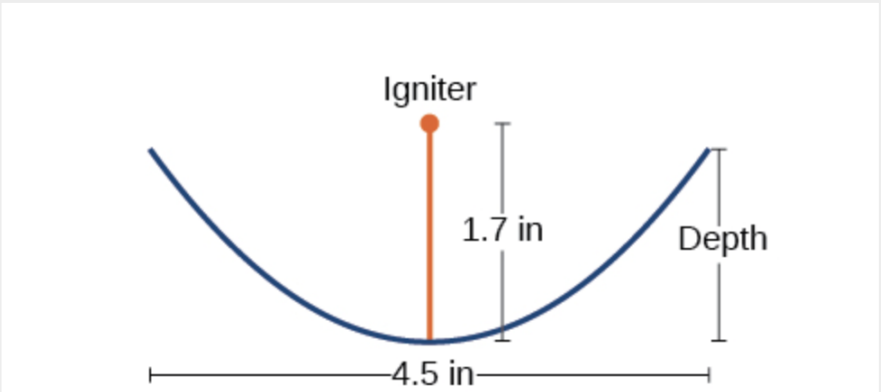


Figure 13 Cross-section of a travel-sized solar fire starter

Example