## "The Parabola"

## Goals

- Use the standard and general forms of the equation of the parabola
- Graph parabolas



## THE PARABOLA

- 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.


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- In the Figure F is the FOCUS
- Line $\ell$ is the DIRECTRIX
- $Y=k$ is the line of symmetry
- V is the vertex $(\mathrm{h}, \mathrm{k})$
- $p$ is the distance from the focus to the vertex


## Standard Form

- Vertex at (h,k) directrix parallel to the y axis

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

- Vertex at $(\mathrm{h}, \mathrm{k})$ directrix parallel to the x axis

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

## Example 1

Find the coordinates of the focus and the vertex and the equations of the directrix and the line of symmetry for a parabola with equation $\mathrm{y}^{2}+2 \mathrm{x}=0$. Then Graph.
STEP 1: write the eqn in standard form

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

F10t1 F10tz F10tz
$\because 1 日(-24)$
个目－5（－2）
$\because 2=\square$
$v_{4}=$
$\forall 5=$
$\because 6=$
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## General Form

- directrix parallel to the $y$ axis

$$
y^{2}+D x+E y+F=0
$$

- directrix parallel to the $x$ axis

$$
x^{2}+D x+E y+F=0
$$

## Example 2

- Write the standard form of
- $x^{2}-8 x-y+18=0$, then graph the parabola.


