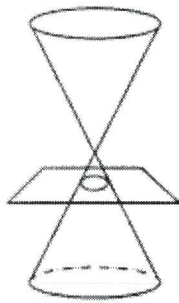
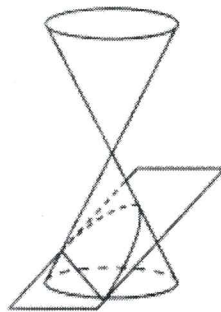


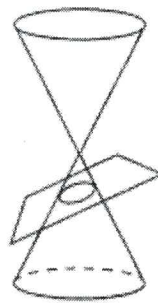
Types of Conics



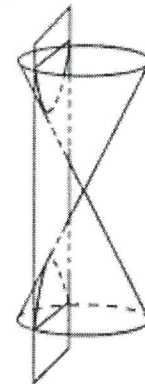
circle



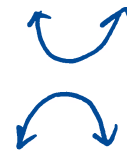
parabola



ellipse



hyperbola



Circles

- We find the radius using the distance formula. $r = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
- **Standard form** of a circle is $(x - h)^2 + (y - k)^2 = r^2$ for center (h, k) and radius, r.
- **General form** of a circle is $x^2 + y^2 + ax + by + c = 0$.

Example: Identify the center and radius of each circle.

a) $(x - 2)^2 + (y - 4)^2 = 36$ Center: (2, 4), radius = 6

b) $(x + 5)^2 + y^2 = 25$ Center: (-5, 0), radius = $\frac{1}{3}$

c) $x^2 + (y - 2)^2 = \frac{1}{9}$ Center: (0, 2), radius = $\frac{1}{3}$

Try to figure out what the last term will be in order to create perfect square trinomials:

Perfect Square Trinomial = Binomial Squared

$x^2 + 12x + \underline{36} = (x + 6)^2$

$x^2 - 14x + \underline{49} = (x - 7)^2$

$x^2 - 10x + \underline{25} = (x - 5)^2$

$x^2 + 5x + \underline{\frac{25}{4}} = (x + \frac{5}{2})^2$

$(\frac{5}{2})^2 = \frac{25}{4}$

$(\frac{B}{2})^2 = C$

Example 1: Identify the center and radius of each circle by writing the equation in standard form:

$$x^2 + y^2 - 8x + 6y - 11 = 0$$

$$x^2 - 8x + y^2 + 6y = 11$$

$$x^2 - 8x + \square + y^2 + 6y + \square = 11 + \square + \square$$

$$x^2 - 8x + 16 + y^2 + 6y + 9 = 11 + 16 + 9$$

$$(x-4)^2 + (y+3)^2 = 36$$

$$\boxed{\text{Center: } (4, -3), \text{ radius} = 6}$$

1. Reorder:
x's together
y's together
constant on
one side

2. Complete the
Square:
 $\left(\frac{B}{2}\right)^2 = C$
Add to both sides

Example 2: Identify the center and radius of each circle by writing the equation in standard form:

$$2x^2 + 2y^2 - 12x + 8y - 24 = 0$$

$$2x^2 - 12x + 2y^2 + 8y = 24$$

$$2(x^2 - 6x) + 2(y^2 + 4y) = 24$$

$$2(x^2 - 6x + 9) + 2(y^2 + 4y + 4) = 24 + 9(2) + 4(2)$$

$$2(x-3)^2 + 2(y+2)^2 = 50$$

$$(x-3)^2 + (y+2)^2 = 25$$

$$\boxed{\text{Center: } (3, -2), \text{ radius} = 5}$$

1. Re-order
2. Factor out "a"
3. Complete the
Square:
Add ac to
both sides.

Example 3: Identify the center and radius of a circle with the equation

$$x^2 + y^2 + y = \frac{3}{4}$$

$$x^2 + y^2 + y + \square = \frac{3}{4} + \square$$

$$x^2 + y^2 + y + \frac{1}{4} = \frac{3}{4} + \frac{1}{4}$$

$$x^2 + \left(y + \frac{1}{2}\right)^2 = 1$$

$$\boxed{\text{Center: } \left(0, -\frac{1}{2}\right), \text{ radius} = 1}$$

$$\left(\frac{B}{2}\right)^2 = C$$

$$\left(\frac{1}{2}\right)^2 = C$$

$$\frac{1}{4} = C$$