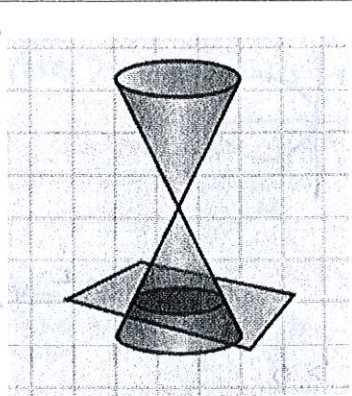


Activity 5.3 - Circles



A circle is the set of all points in a plane that are equidistant from a fixed point called the center.

Standard Form of the Equation of a Circle

The standard equation of a circle with radius r and center (h, k) is:

$$(x-h)^2 + (y-k)^2 = r^2$$

$$\frac{(x-h)^2}{r^2} + \frac{(y-k)^2}{r^2} = 1 \quad (\text{ELLIPSE?})$$

Examples:

① $\frac{(x-2)^2}{9} + \frac{(y+3)^2}{9} = 1$

$$(x-2)^2 + (y+3)^2 = 9 \Rightarrow C(2, -3) \quad r=3$$

② $(x-4)^2 + (y-1)^2 = 49 \Rightarrow C(4, 1) \quad r=7$

③ $(x-3)^2 + (y+5)^2 = 4 \Rightarrow C(3, -5) \quad r=2$

④ $C(-4, 2) \quad r=12 \Rightarrow (x+4)^2 + (y-2)^2 = 144$

⑤ $C(0, 3)$ PASSING THROUGH ~~(0, 0)~~ $(2, 8)$

$r = \sqrt{(2-0)^2 + (8-3)^2} = 8$

$$x^2 + (y-3)^2 = 64$$

$$r = \sqrt{(2-0)^2 + (3-8)^2} = \sqrt{4+25} = \sqrt{29}$$

$$x^2 + (y-3)^2 = 29$$

Given an equation in the form $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$,

ONLY x^2 OR y^2

ELLIPSE x^2, y^2
SAME SIGN DIFF COEFFS.
CIRCLE x^2, y^2
SAME SIGN SAME COEFF.

It is a parabola if: $B^2 - 4AC = 0$

It is an ellipse or circle if: $B^2 - 4AC < 0$

It is a hyperbola if: $B^2 - 4AC > 0$

x^2, y^2 DIFF SIGNS.