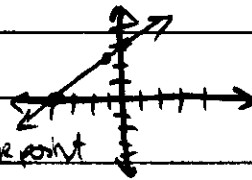


Algebra 3.2 Graphs of Equations (Circles)

Graph using intercepts

EX Graph $-3x + 4y = 12$

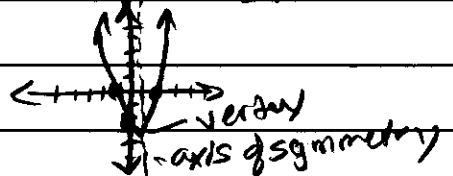
$$\begin{array}{r|l} x & y \\ -4 & 0 \\ 0 & 3 \\ -1 & \frac{3}{4} \text{ - check point} \end{array}$$



Quadratic Equations (Degree of 2 or more - U shape \cup)

EX Graph $y = x^2 - x - 2$

$$\begin{array}{r|l} x & y \\ 0 & -2 \\ 2 & 0 \end{array}$$



Circles

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

EX Find the center and radius of $(x+3)^2 + (y-5)^2 = 25$

center $(-3, 5)$ radius $= \sqrt{25} = 5$

EX Find the center and radius of $(x+\frac{2}{3})^2 + (y+\frac{7}{3})^2 = 18$

center $(-\frac{2}{3}, -\frac{7}{3})$ radius $= \sqrt{18} = 3\sqrt{2}$

EX Write an equation for a circle w/ center $(1, -6)$ & radius of 10

$$(x-1)^2 + (y+6)^2 = 100$$

EX Write an equation for a circle w/ center $(-4, 0)$ & radius of $5\sqrt{3}$

$$(x+4)^2 + y^2 = 75$$

EX Find the equation of a circle w/ endpoints of diameter $(-2, 5)$ & $(4, 5)$

$$d = \sqrt{(4-(-2))^2 + (5-5)^2} = \sqrt{36} = 6 \quad \text{radius} = \frac{6}{2} = 3$$

$$M = \left(\frac{-2+4}{2}, \frac{5+5}{2} \right) = (1, 5)$$

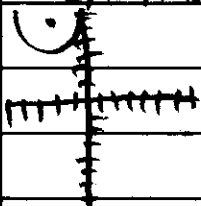
$$(x-1)^2 + (y-5)^2 = 9$$

EX Find the equation of a circle w/ center $(-3, 5)$ that is tangent to the x-axis

☺ $(x+3)^2 + (y-5)^2 = 25$

EX Find the equation of a circle w/ center $(-2, 7)$ that is tangent to the y-axis

☺ $(x+2)^2 + (y-7)^2 = 4$



Algebra 3.2

EX Find the center & radius of the following $x^2 - 6x + y^2 + 4y - 7 = 0$

$$x^2 - 6x + 9 + y^2 + 4y + 4 = 7 + 9 + 4$$

$$(x+3)^2 + (y+2)^2 = 20$$

$$\text{center } (-3, -2) \quad \text{radius} = \sqrt{20} = 2\sqrt{5}$$

EX Find the center & radius of the following $x^2 + 10x + y^2 - 3y + 2 = 0$

$$x^2 + 10x + 25 + y^2 - 3y + \frac{9}{4} = -2 + 25 + \frac{9}{4}$$

$$(x+5)^2 + (y - \frac{3}{2})^2 = \frac{-8 + 100 + 9}{4} = \frac{101}{4}$$

$$\text{center } (-5, \frac{3}{2}) \quad \text{radius} = \sqrt{\frac{101}{4}} = \frac{\sqrt{101}}{2}$$

EX Is the point (3,5) inside, outside, or on the circle

$$(x-2)^2 + (y-1)^2 = 36$$

$$(3-2)^2 + (5-1)^2 = 36$$

$$1 + 16 = 36$$

$17 < 36$ less than means inside the circle

Test for Symmetry

Symmetry with respect to y-axis

EX $y = 3x^2$ (plug in $-x$, answer should be identical)

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

$$y = 3x^2$$

Symmetrical w/ y axis

EX $y = 5x^3 - x$

$$y = 5(-x)^3 - (-x)$$

$$y = -5x^3 + x$$

not symmetrical w/ y axis

Symmetry with respect to the origin



(x, y)

$(-x, -y)$ plug in both x & y