Ch. 3 – Board Problems

NAME AND GRAPH EACH EQUATION.

1) $y = x^2 - 2x - 5$

2) $5x + 3y = 6$

3) $9(x-3)^2 + 25(y-9)^2 = 225$

4) $x^2 + y^2 + 2x = 55 + 10y$

Ch. 3 - Hyperbolas and Systems of Equations

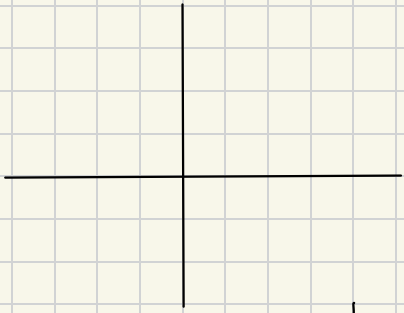
General equations for Hyperbola's.

$y = \frac{1}{x}$

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

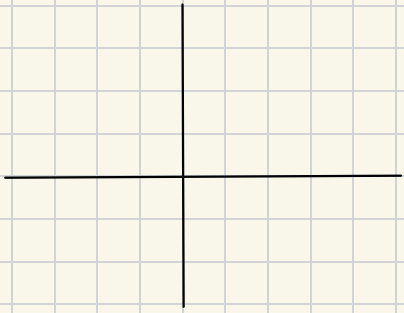
$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$

Ex. 1 $x^2 - 4y^2 - 4 = 0$



Asymptotes are $y = \frac{b}{a}x$

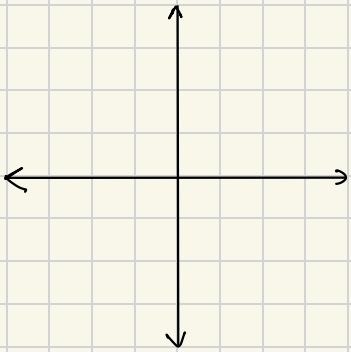
Ex. 2 $-4x^2 + y^2 - 4 = 0$



EX. 3 $xy = 6$

x	y

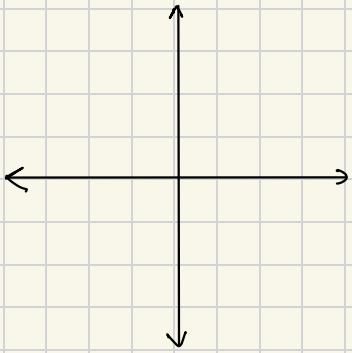
x	y



EX. 4 $xy = -6$

x	y

x	y



SYSTEMS OF EQUATIONS

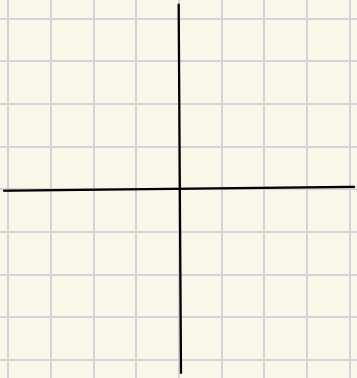
FIND THE SOLUTION(S) [intersections] of:

EX. 5

$y = 1 - x^2$ _____

$y = x^2 - 1$ _____

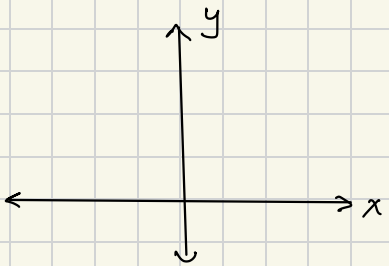
substitute and solve for x, y



EX. 6 FIND THE SOLUTION.

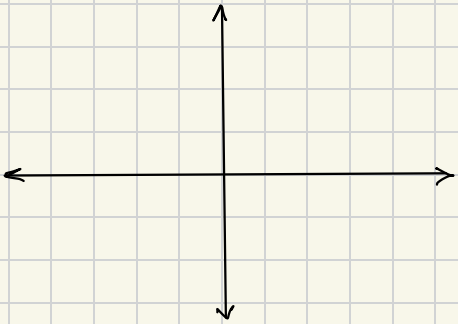
$y = x^2$

$x - y + 2 = 0$



INEQUALITIES

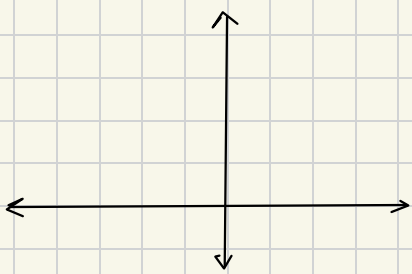
$y \geq 1 - x^2$



PROVE WHERE TO SHADE:

$y \geq 1 - (\ )^2$

EX. 7 $y < x^2$



All quadratic equations follow the form:

$$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$$

Curve	A	B	C	D	E	F	Comments
Line	0	0	0	RN	RN	RN	D = 0 yields a horizontal line
							E = 0 yields a vertical line
Parabola (up/down)	RN	0	0	R	RN	R	A, E same signs = "frown"
							A, E different signs = "smile"
Parabola (left/right)	0	0	RN	RN	R	R	C, D same sign = "c" on left
							C, D different sign = "c" on right
Circle	RN	0	RN	R	R	RN	A must equal C
Ellipse	RN	0	RN	R	R	RN	A, C must be the same sign
							x > y = football, y > x = egg
Hyperbola (left/right)	RN	0	RN	R	R	RN	+A = symmetry about y-axis
							A & C must be opposite signs
Hyperbola (up/down)	RN	0	RN	R	R	RN	-A = symmetry about y-axis
							A & C must be opposite signs
Hyperbola (quadrants)	0	RN	0	0	0	RN	+ F = graph in quadrants II, IV
							- F = graph in quadrants I, III

0 - means that the value of the coefficient must be zero.

R - the value of the coefficient may be any positive or negative real number, including zero.

RN - the value of the coefficient may be any positive or negative real number, not including zero.