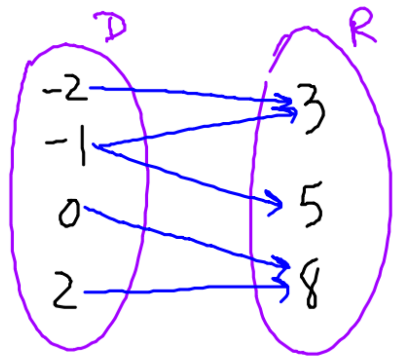
Sec 2-1

Relation

Domain Range

Set of (x, y) pairs of numbers

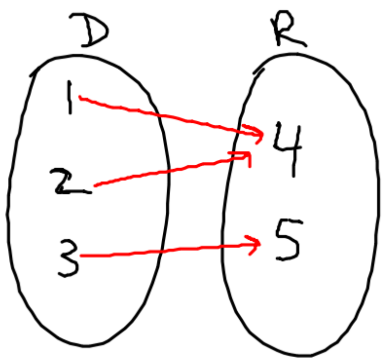
Ex $\{(2, 8)\ (-1, 5)\ (0, 8)\ (-1, 3)\ (-2, 3)\}$



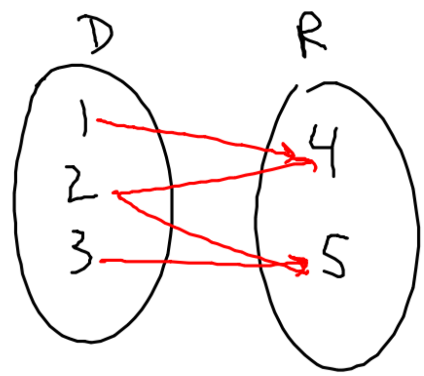
Mapping Diagram

Function

Relation where each element in domain is paired with exactly one element in range

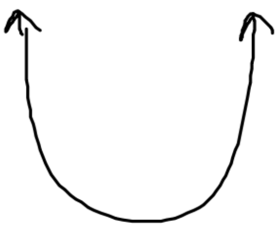


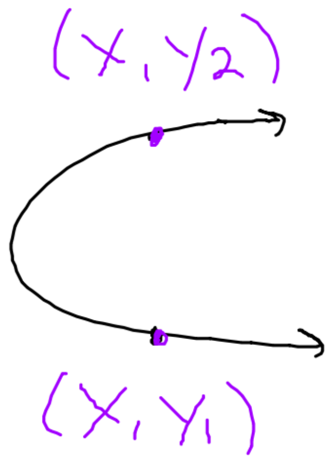
Function



Not Function

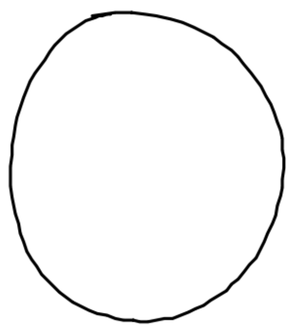
Vertical Line Test





Function

Not Function

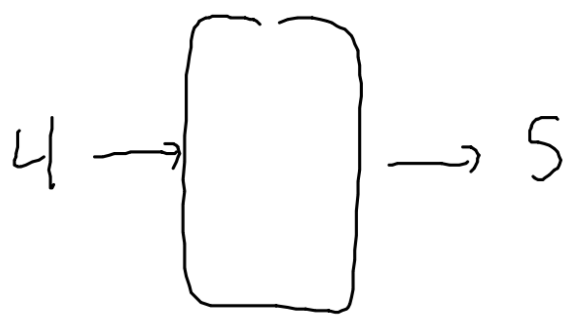


Function Notation

$$f(x) = 2x - 3$$

"f of x"

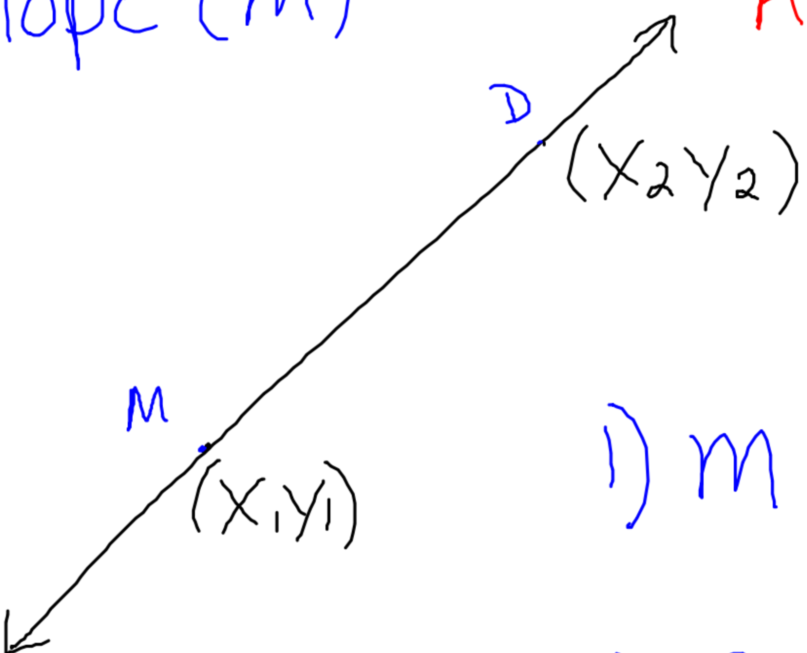
<u>Ex</u> Find $f(4) \rightarrow 2(4) - 3 = 5$



Sec 2-2

Slope (m)

$Ax + By = C$



1) $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

2) $2x + 3y = 6$

$m = -\dfrac{A}{B} = -\dfrac{2}{3}$

Special Slopes

Horizontal Lines $= \frac{0}{?} = 0$ Slope

Vertical Lines $= \frac{?}{0} =$ No/Undefined Slope

Parallel Lines - Same Slope $(m_1 = m_2)$

Perpendicular Lines - Opposite Reciprocals

$(m_1 \cdot m_2 = -1)$

Points $(5, -2)$ and $(3, 1)$

$$\text{Slope} = \frac{-2-1}{5-3} = \frac{-3}{2} \text{ or } \frac{3}{-2} \text{ or } -\frac{3}{2}$$

$$\text{Parallel Slopes} = -\frac{3}{2}$$

$$\text{Perpendicular Slopes} = \frac{2}{3}$$

Writing Linear Equations

Point (x_1, y_1) and Slope (m)

Point Slope Formula

$$y - y_1 = m(x - x_1)$$

Slope Intercept Form

$$y = mx + b$$

Standard Form

$$Ax + By = C$$

No Fractions

Positive

Ex Slope $= \frac{1}{2}$ Contains $(4, -6)$

$$y - y_1 = m(x - x_1)$$

$$y + 6 = \frac{1}{2}(x - 4)$$

slope-int

$$y + 6 = \frac{1}{2}x - 2$$

$$y = \frac{1}{2}x - 8$$

standard

$$2\left(y + 6 = \frac{1}{2}x - 2\right)$$

$$2y + 12 = x - 4$$

$$-1(-x + 2y = -16)$$

$$x - 2y = 16$$

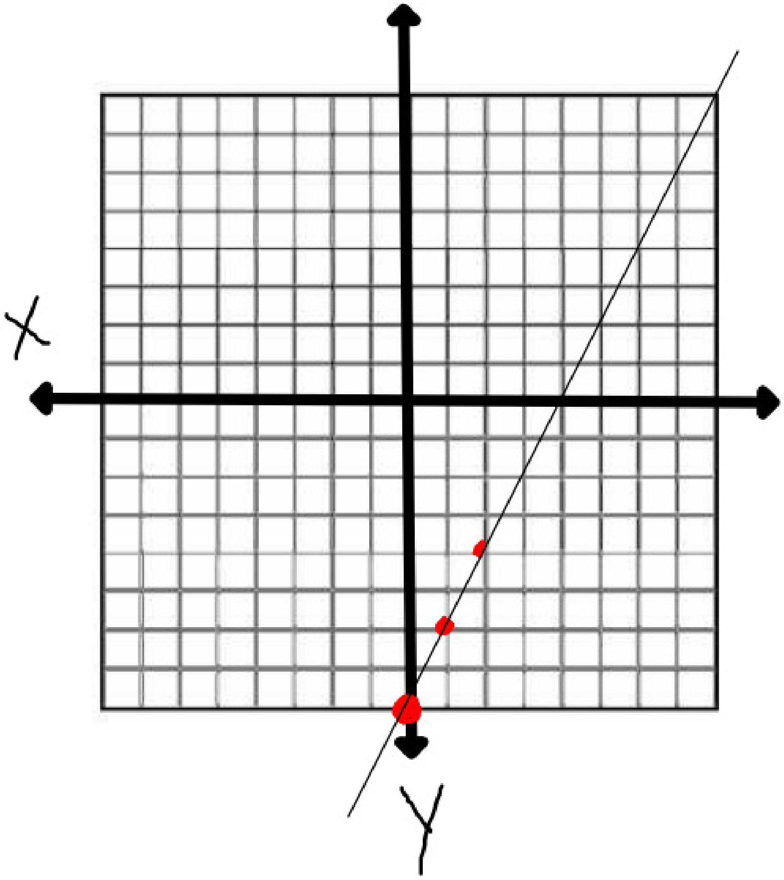
Vertical Line Equations

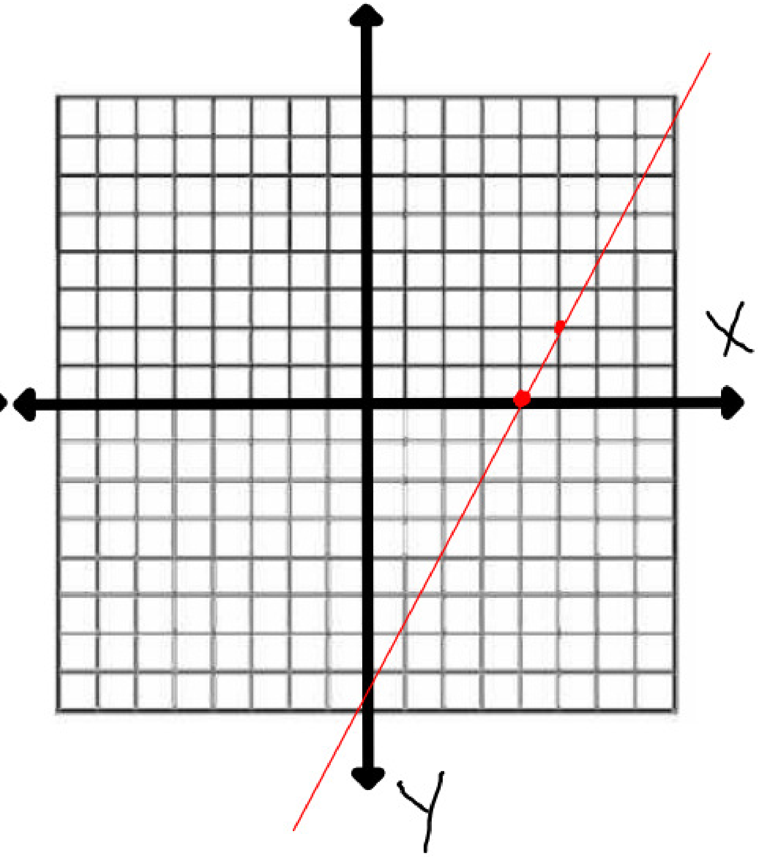
$X = ?$

Horizontal Line Equations

$Y = ?$

Graph $2x - y = 8$





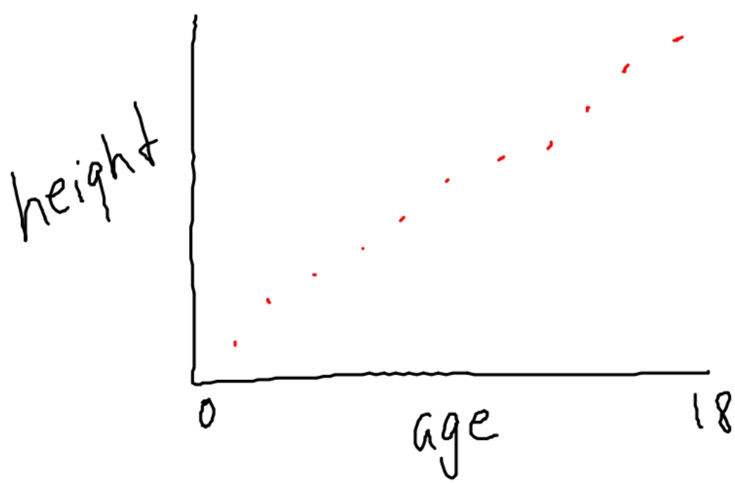
$$2x - y = 8$$
$$-y = -2x + 8$$
$$y = 2x - 8$$

x	y
4	0
5	2

2 - 4

Determining Linear Relationships

<u>Ex</u> (age, height)



Scatterplot

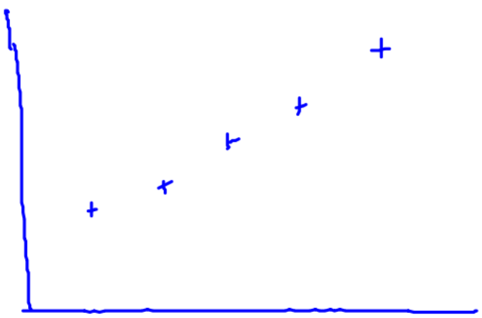
Determining Linear Relationships (age, height)

visually

mathematically

Scatter Plot

Dependent / Response Variable (Y)



Independent / Explanatory Variable (x)

Correlation (r)

$$-1 \le r \le 1$$

$$(|r| \ge .90)$$

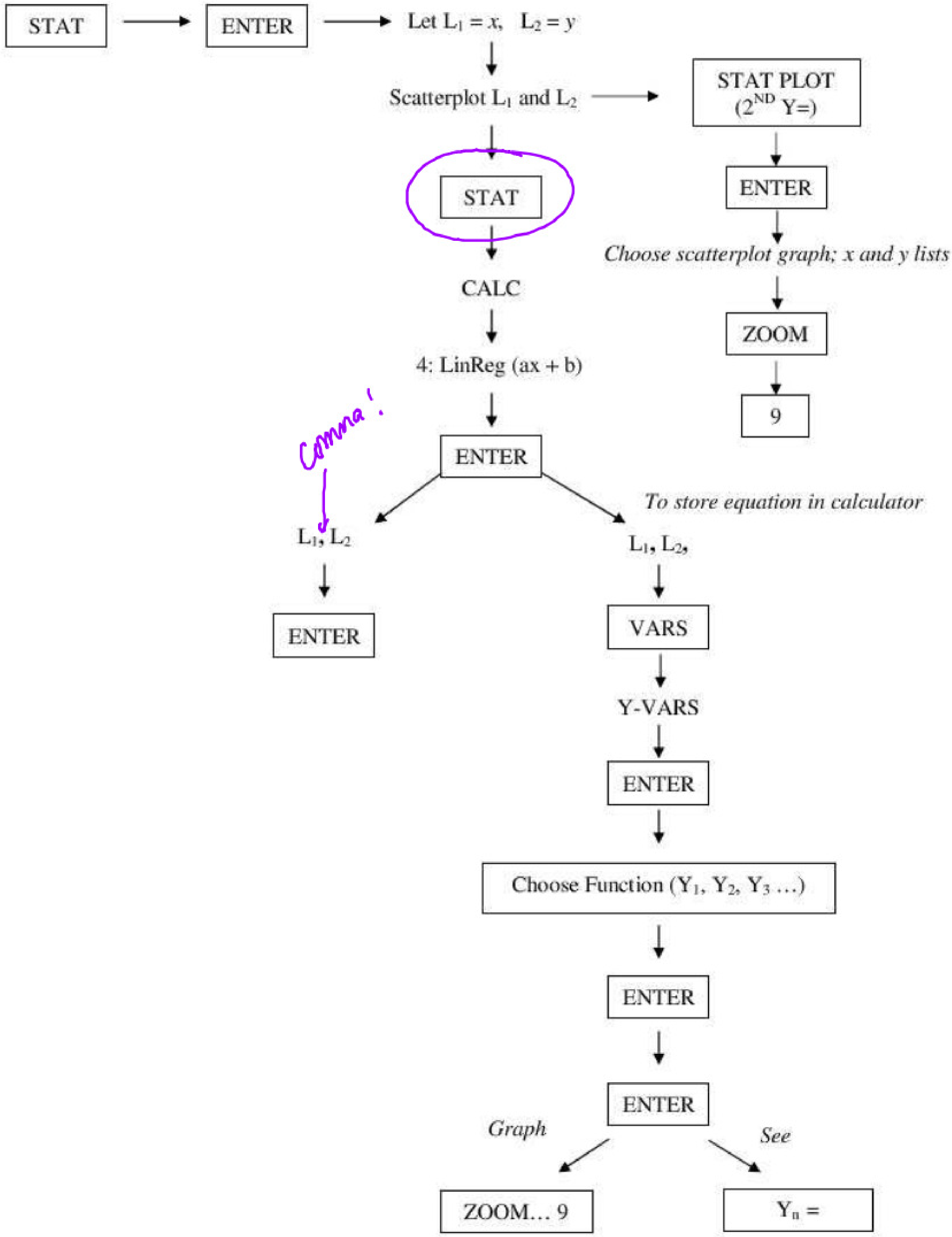
★ IF DATA IS LINEAR, A TREND LINE / BEST FIT LINE CAN BE USED TO MAKE PREDICTIONS

An art expert compares her guesses for the selling price of paintings (in thousands of dollars) to the actual selling price.

Guess (x)	12	7	10	5	9
Actual (y)	11	8	12	3.8	10

FINDING BEST FIT LINES

(TI-83/84)



1) Scatterplot Data / State Correlation

$r = .91$

2) State equation of trend line / best fit line

$y = 1.0863x - .3822$ | $\widehat{\text{Actual}} = 1.0863(\text{Guess}) - .3822$

3) Use equation to make predictions

\$11,000? | $\widehat{\text{Actual}} = 1.0863(11{,}000) - .3822$

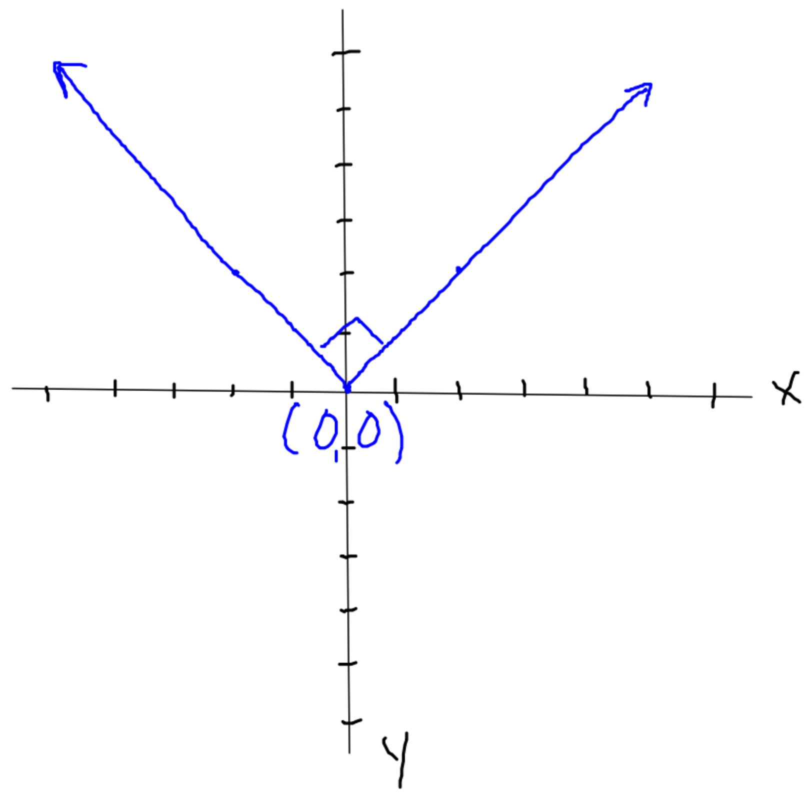
$= \$11{,}949$

2-5 and 2-6

Absolute Value Graphs → Angles

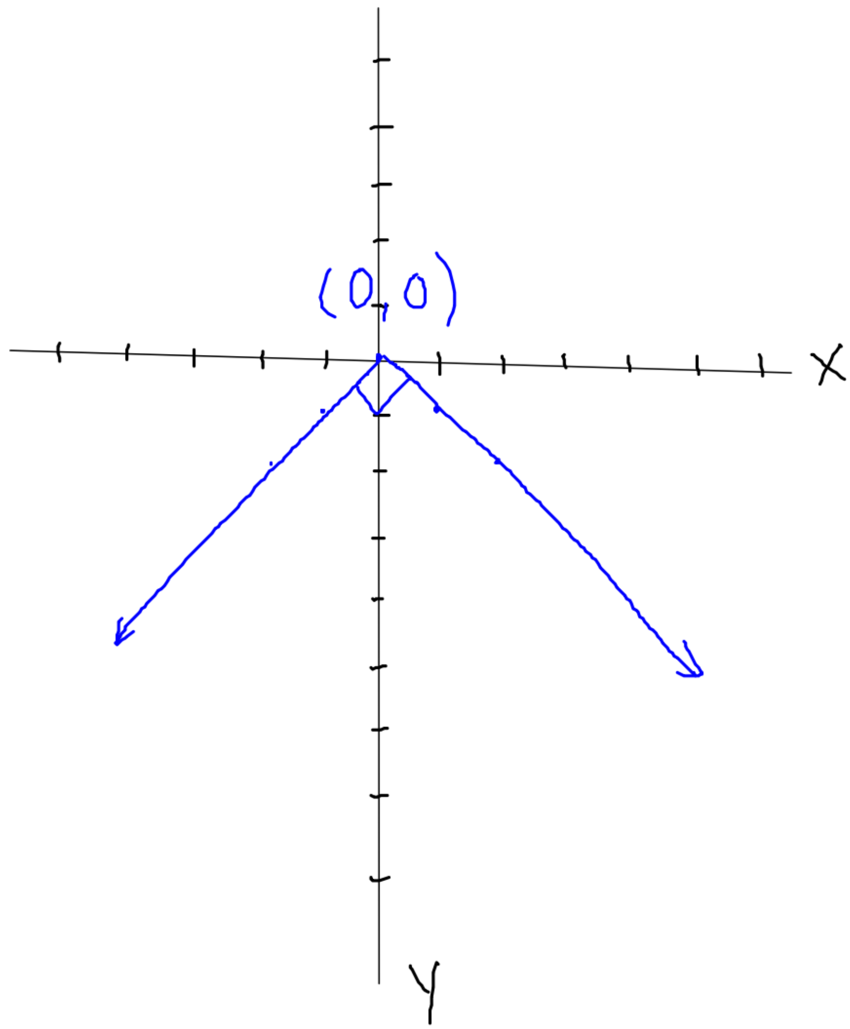
$y = |x|$

X	Y
0	0
2	2
-2	2



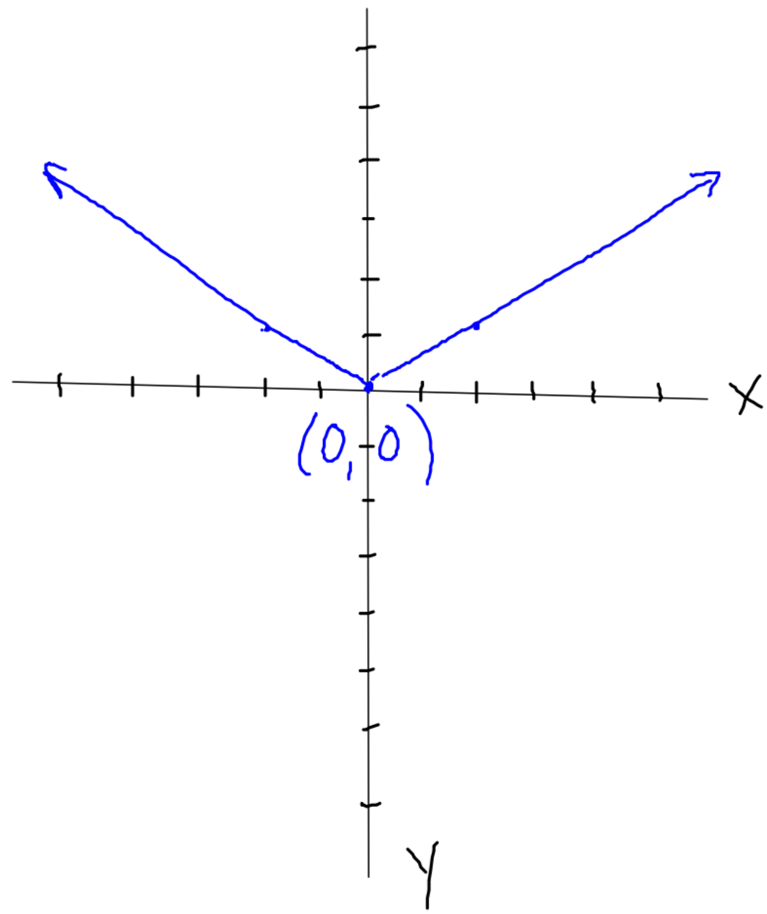
$y = -|x|$

x	y
0	0
1	-1
-1	-1
2	-2
-2	-2



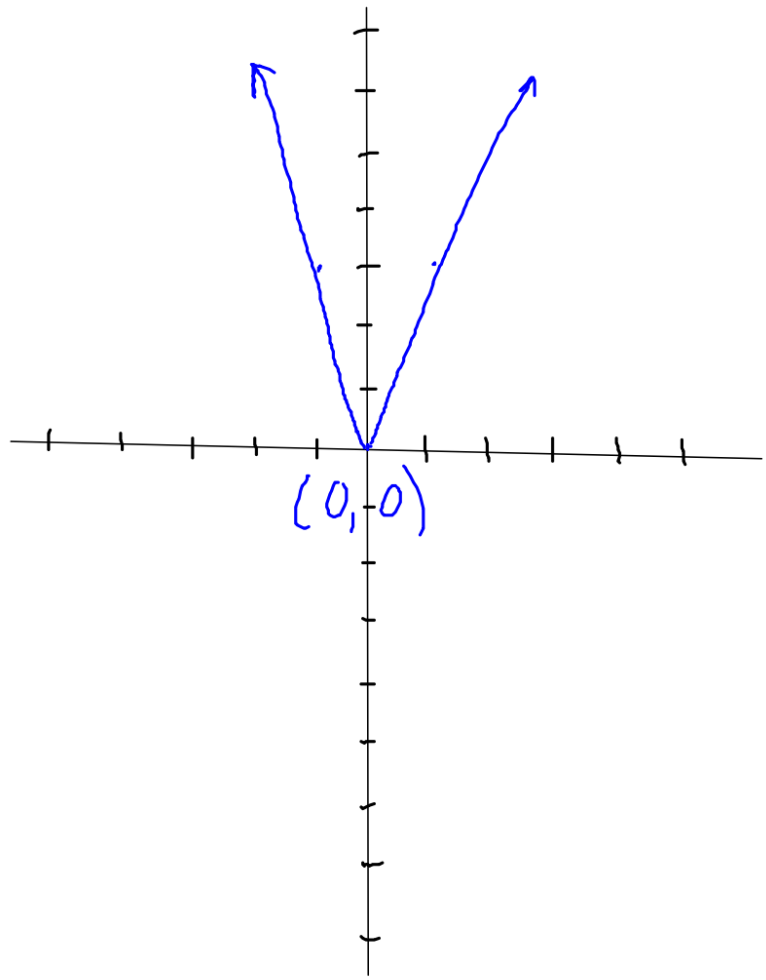
$$Y = \frac{1}{2}|x|$$

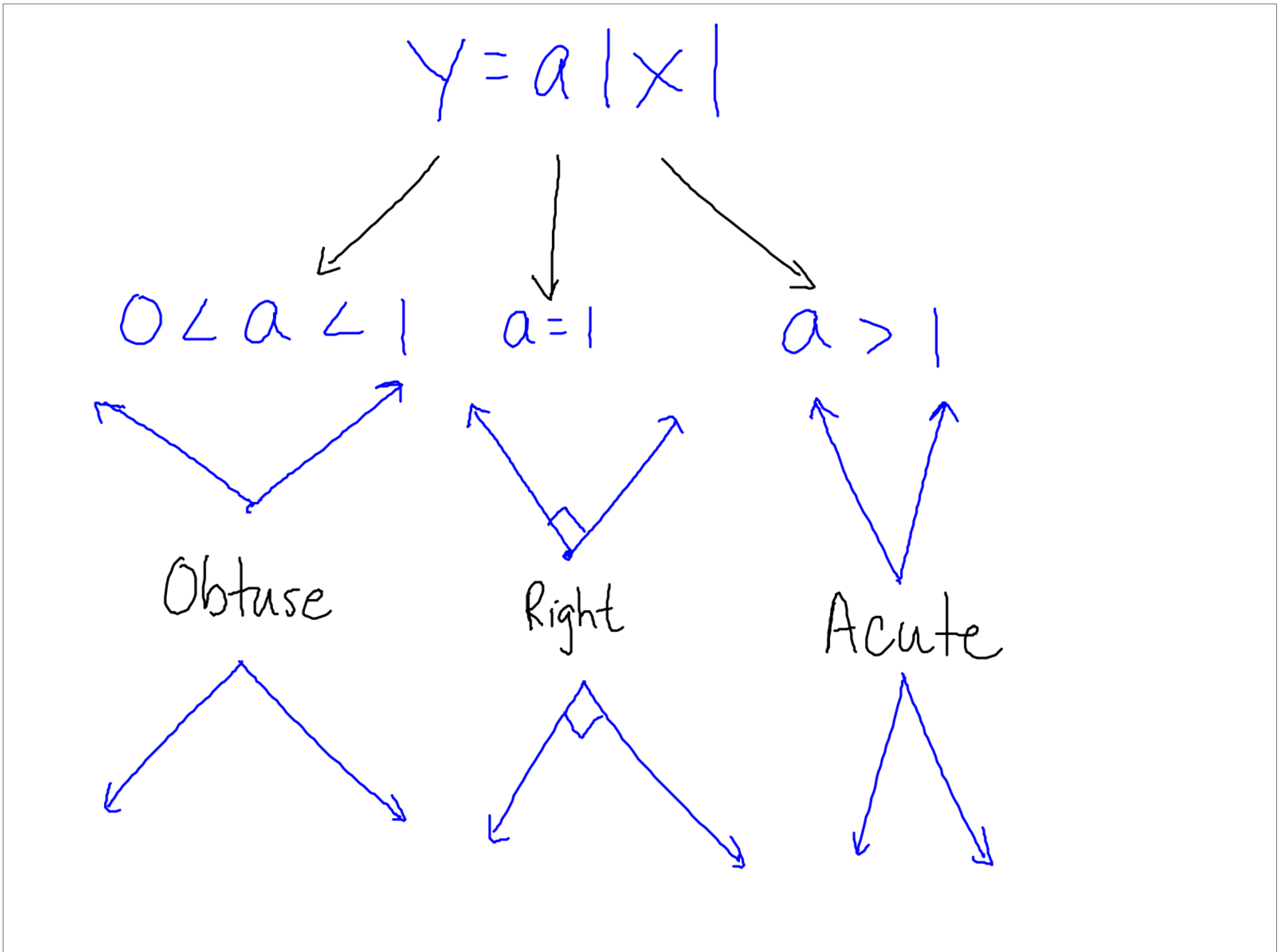
X	Y
0	0
2	1
-2	1



$y = 3|x|$

X	Y
0	0
1	3
-1	3





$y = a|x|$
$0 < a < 1$
$a = 1$
$a > 1$
Obtuse
Right
Acute

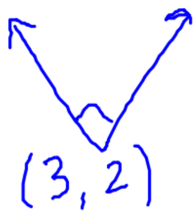
$$y = a|x-h|+k$$

Vertex (h, k)

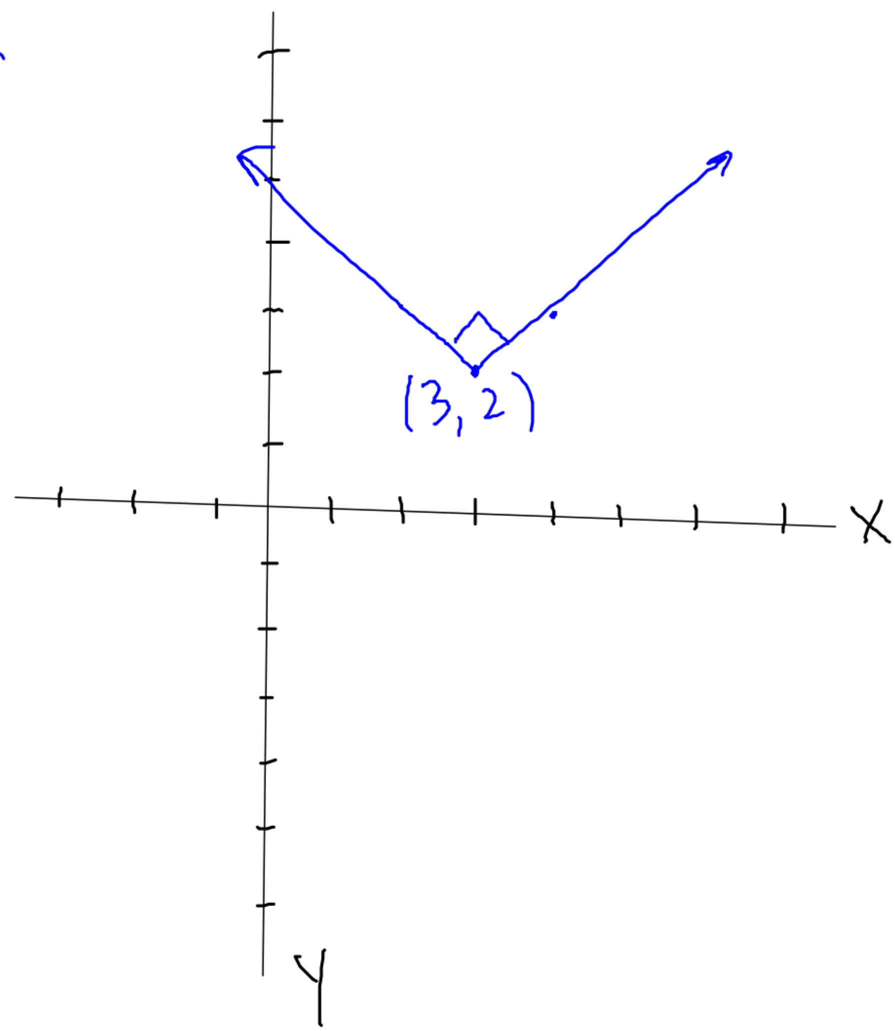
$y = 2|x-3|+4 \longrightarrow V(3, 4)$

$y = 2|x+3|-4 \longrightarrow V(-3, -4)$

$y = |x - 3| + 2$

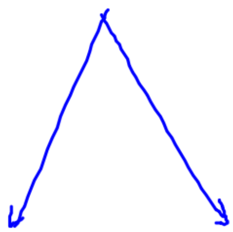


X	Y
4	3
2	3

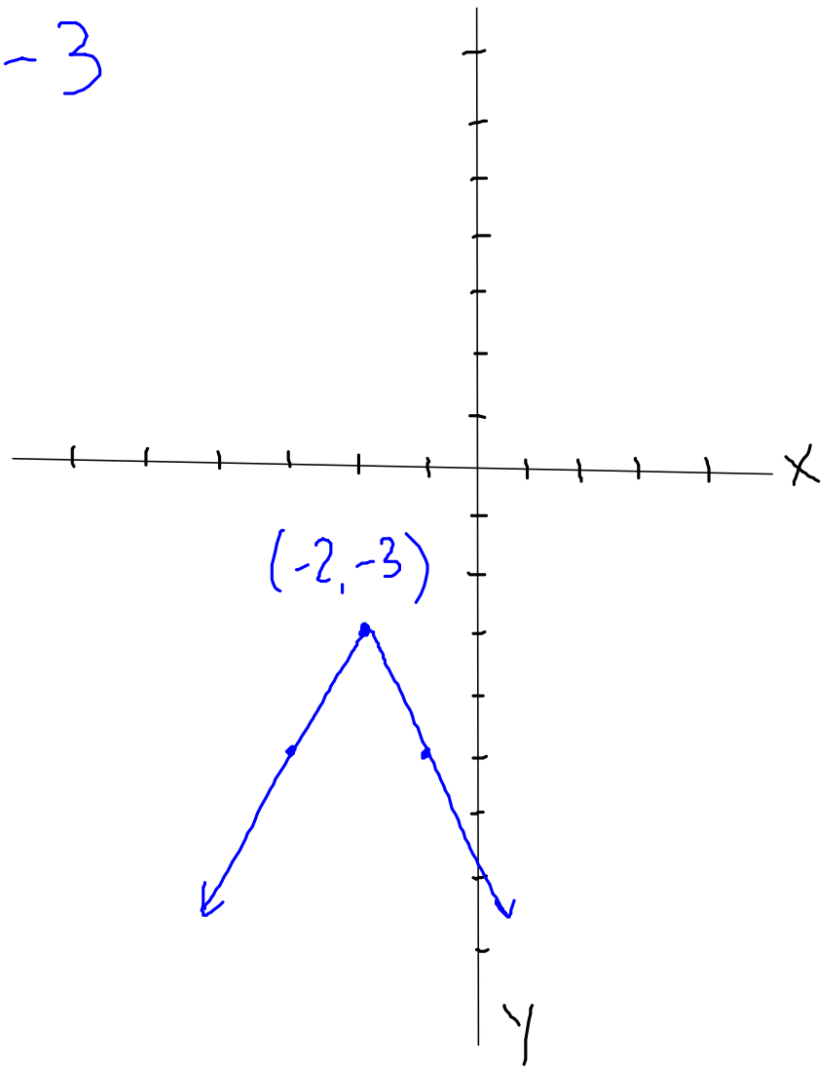


$$y = -2|x+2| - 3$$

$(-2, -3)$



X	Y
-1	-5
-3	-5



Sec 2-7

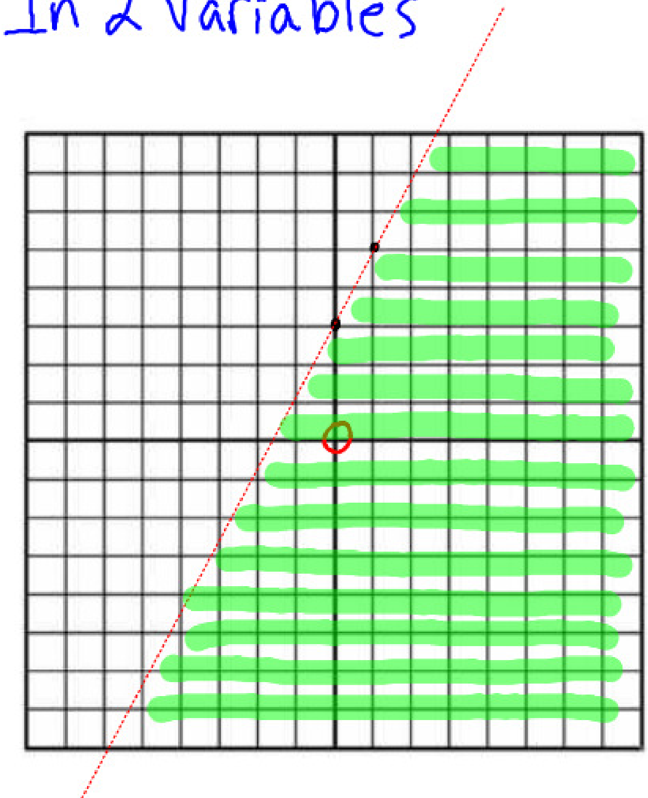
Inequalities In 2 Variables

$y < 2x + 3$

$0 < 0 + 3 < 3$

$y = 2x + 3$

x	y
0	3
1	5



$0 \geq |-2| - 1 \geq 1$

$y \geq |x - 2| - 1$

$y = |x - 2| - 1$