Lesson 8-1

linear equation	
Definition a graph that forms a straight line	Example $y = \frac{1}{2}x - 3$

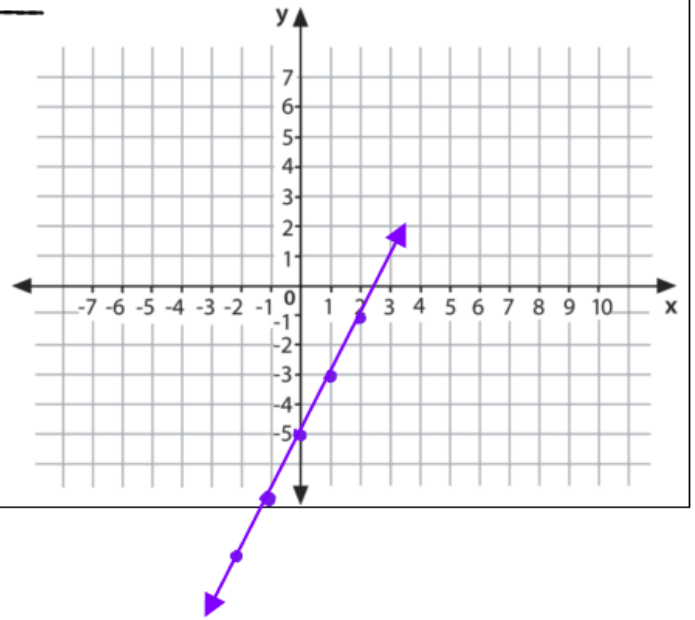
Example 1: Graph each equation and tell whether or not it is linear.

I Do

$y = 2x - 5$

linear

X	2x-5	y
-2	2(-2) -5 -4-5	-9
-1	2(-1) -5 -2-5	-7
0	2(0) -5 0-5	-5
1	2(1) -5 2-5	-3
2	2(2) -5 4-5	-1



We Do

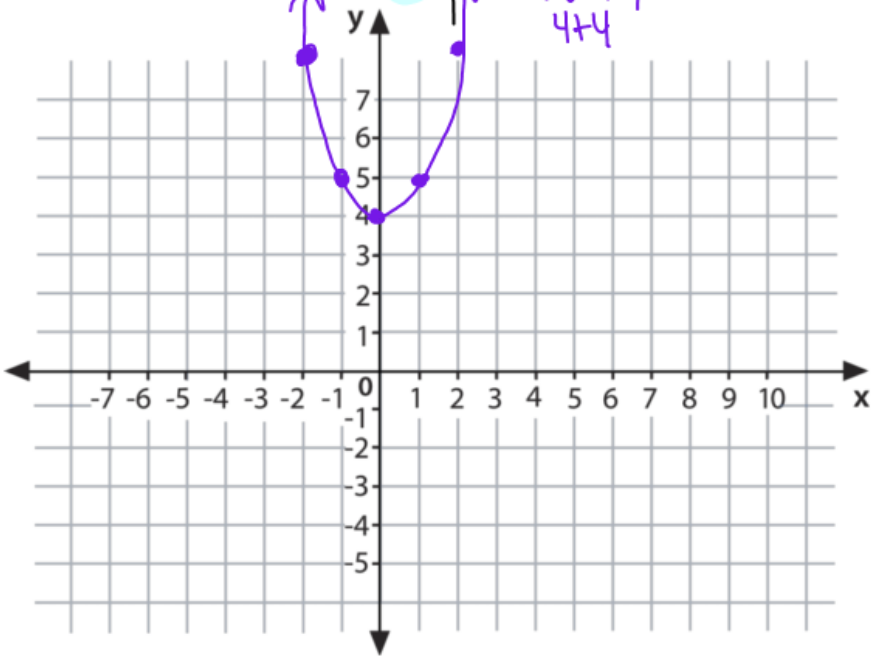
$y = x^2 + 4$

x^2

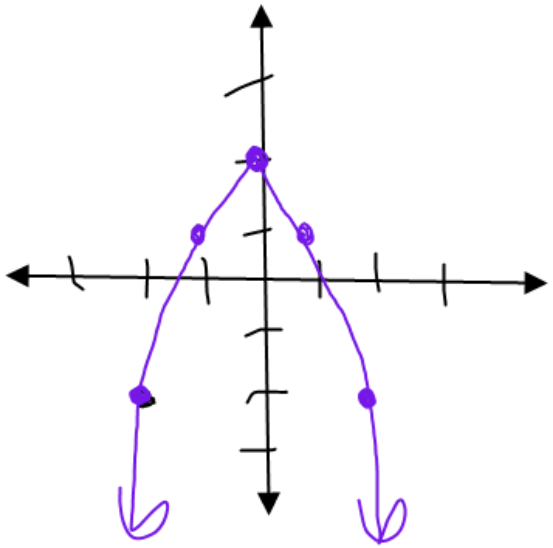
"u" shaped

not linear

x	x^2+4	y
-2	$(-2)^2+4$, $-2 \cdot -2$, $4+4$	8
-1	$(-1)^2+4 = 1+4$	5
0	0^2+4	4
1	$(1)^2+4$, $1+4$	5
2	$(2)^2+4$, $4+4$	8



$y = -x^2 + 2$



x	$-x^2+2$	y
-2	$-(-2)^2+2$	-2
	$-4+2$	
-1	$-(-1)^2+2$	1
	$-1+2$	
0	$0^2 = 0+2$	2
1	$-(1)^2+2$	1
	$-1+2$	
2	$-(2)^2+2$	-2
	$-4+2$	

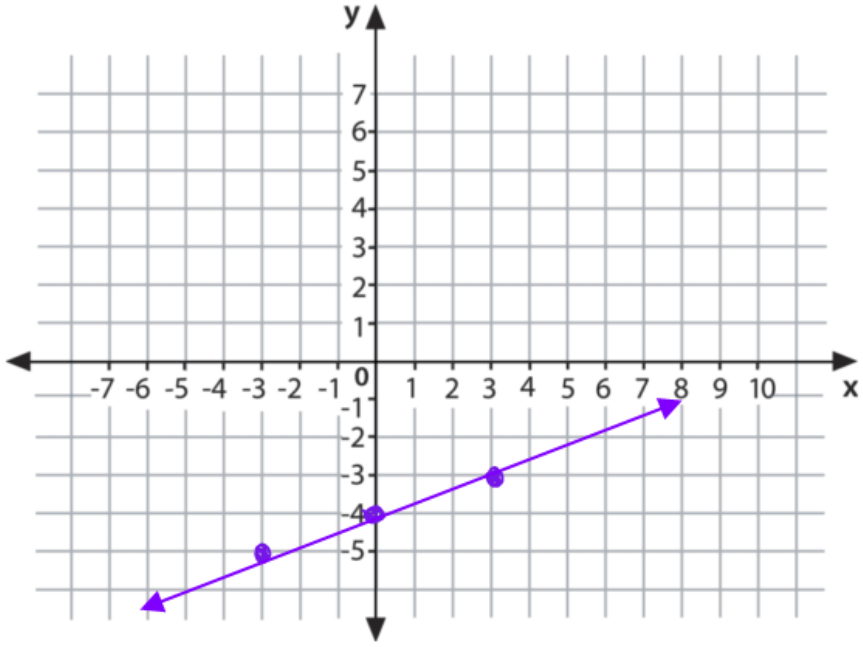
$y = 2x - 3$ → 3 #'s

x^2
$|x|$ } 5 #'s

We Do

$y = \frac{1}{3}x - 4$

x	$\frac{1}{3}x - 4$	y
-3	$\frac{1}{3} \cdot -3 - 4 = -1 - 4$	-5
0	$\frac{1}{3} \cdot 0 - 4 = 0 - 4$	-4
3	$\frac{1}{3} \cdot 3 - 4 = 1 - 4$	-3



You Do

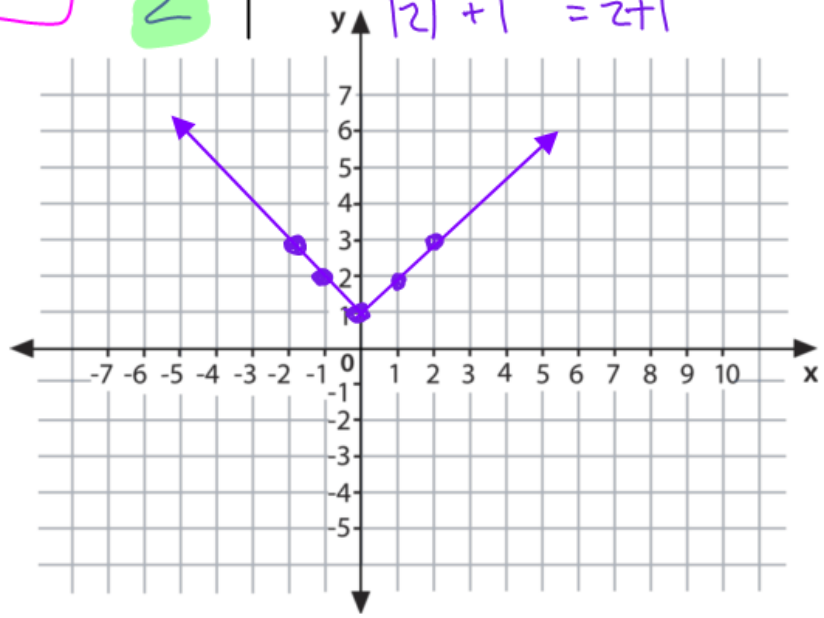
$y = |x| + 1$

|x|

"V" shaped

Not linear

x	|x| + 1	y
-2	|-2| + 1 = 2 + 1	3
-1	|-1| + 1 = 1 + 1	2
0	0 + 1	1
1	|1| + 1 = 2	2
2	|2| + 1 = 2 + 1	3



rate of change

aka slope

Definition	Example
change in "y's" / change in "x's"	(2, 10) (4, 16) $\frac{16-10}{4-2} = \frac{6}{2} = 3$

Example 2: Determine whether the rate of change is constant or variable. If it's constant, find the rate of change.

I Do

x	0	1	3	6	8
y	0	4	8	8	6

$\frac{y's}{x's} = \frac{4-0}{1-0} = \frac{4}{1} = 4$

$\frac{y's}{x's} = \frac{8-4}{3-1} = \frac{4}{2} = 2$

Variable

We Do

x	0	1	4	6	7
y	1	2	5	7	8

$\frac{y}{x}$ $\frac{2-1}{1-0} = \frac{1}{1} = 1$

$\frac{y}{x}$ $\frac{5-2}{4-1} = \frac{3}{3} = 1$

constant 1

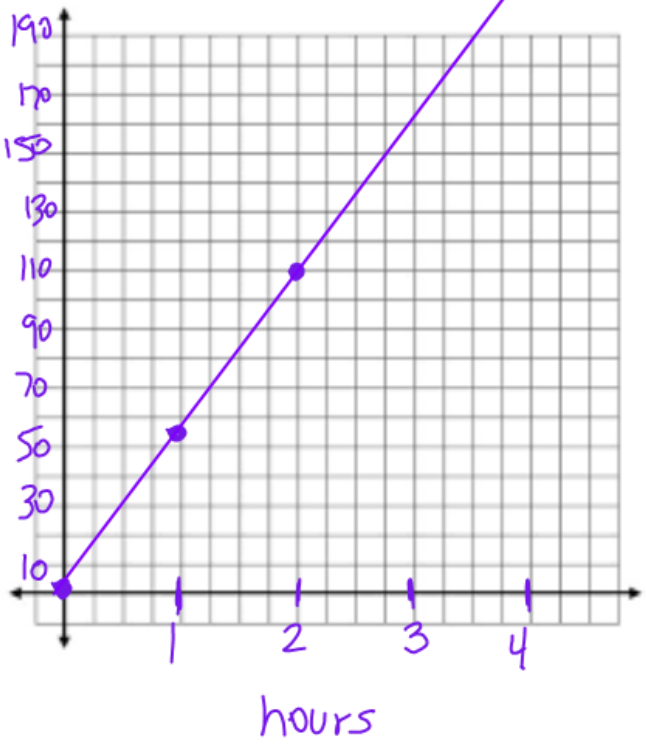
We Do		You Do	
x	y	x	y
0	0	1	0
1	2	3	2
3	6	4	6
5	10	6	6
8	16	9	3

$\frac{y}{x}$ $\frac{2-0}{1-0}=\frac{2}{1}$ = 2 ; $\frac{16-10}{8-5}=\frac{6}{3}$ = 2 ; constant 2

$\frac{y}{x}$ $\frac{2}{3-1}=\frac{2}{2}$ = 1 ; $\frac{3-6}{9-6}=\frac{-3}{3}$ = -1 ; variable

Example 3: Application

The equation d=55h represents how far someone has driven after h number of hours. Graph the linear equation. Predict how far you will go after driving for 5 hours.



$y = 55x$; $d = 55h$

h (x)	d (y)
0	0
1	55
2	110

55.0
55.1
55.2

55.5 = 275 miles in 5hrs.