

Non- Linear Functions

What makes a function linear? *A constant slope*

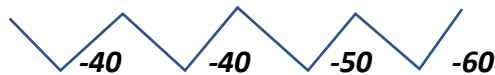
Will the following points form a linear function?

a) (1, 19) (3, 35) (5, 51) (7, 67) (9, 83)



as $x \rightarrow 2$ y goes $\uparrow 16$ *Linear!*

b) (1, 22) (2, -18) (3, -58) (4, -108) (5, -168)



Not Linear!

c) (0, 17) (5, 42) (10, 67) (20, 117) (100, 517)



as $x \rightarrow 5$ y goes $\uparrow 25$ *Linear!*

(notice x-values follow the pattern too $m=5$)

Will the following functions be linear?

a) $f(x) = \frac{1}{2}x + 19$
linear $m = \frac{1}{2}$

b) $f(x) = \frac{1}{3}x^2 - 4$
non linear

c) $f(x) = \frac{3}{x+2}$
non linear

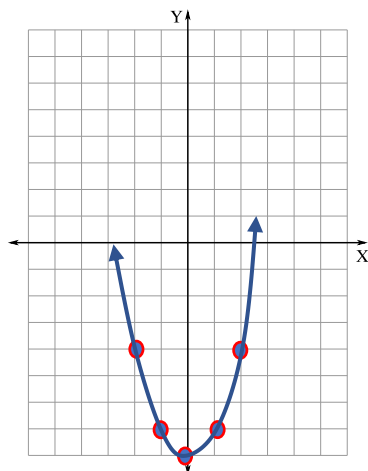
Graphing a non-linear function

• can't just use 2 points - *Why? y-values change but not in a linear fashion*

• We usually use a minimum of 5 points

a) $f(x) = x^2 - 8$

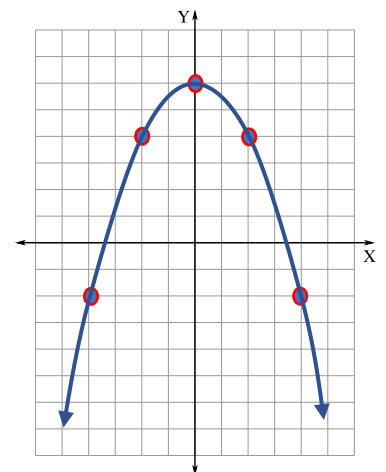
x	f(x)
-2	-4
-1	-7
0	-8
1	-7
2	-4



Next points symmetrical too ($\pm 3, 1$)

b) $f(x) = -\frac{1}{2}x^2 + 6$

x	f(x)
-4	-2
-2	4
0	6
2	4
4	-2

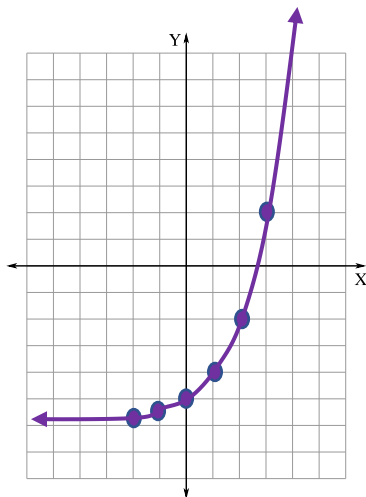


Why did I change the x's here?

I wanted the values to be divisible by 2 (nice pts)

c) $f(x) = 2^x - 6$

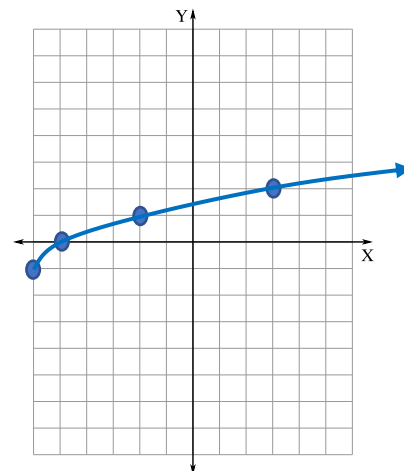
x	f(x)
-2	-5.75
-1	-5.5
0	-5
1	-4
2	-2
3	2
4	10



Looks like this graph never gets to -6?

d) $f(x) = \sqrt[2]{x+6} - 1$

x	f(x)
-8	error
-6	-1
-5	0
-2	1
3	2
10	3
19	4



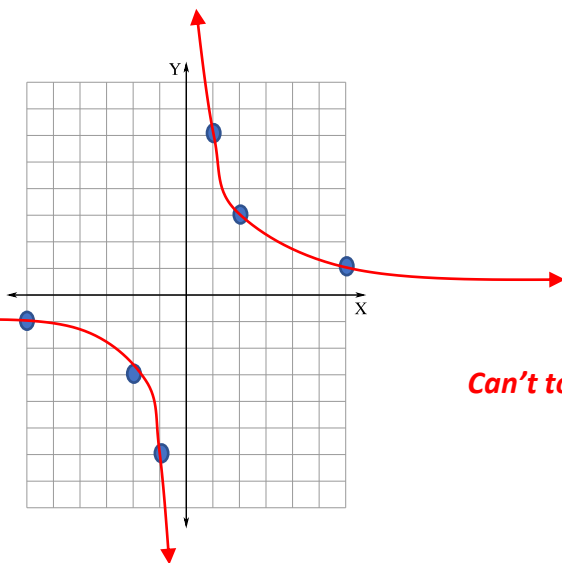
No arrow on left!

Why did I choose these x's ?

They made perfect squares under $\sqrt{\quad}$

e) $f(x) = \frac{6}{x}$

x	f(x)
-6	-1
-2	-3
-1	-6
0	error
1	6
2	3
6	1



Can't touch $x = 0$ or $y = 0$

Why did I choose these x's ?

They divide into 6

ASSIGNMENT = Worksheet

Non-Linear Functions (Worksheet)

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#3a)

3b)

3c)

3d)

4a)

b)

c)

#5a)

3b)

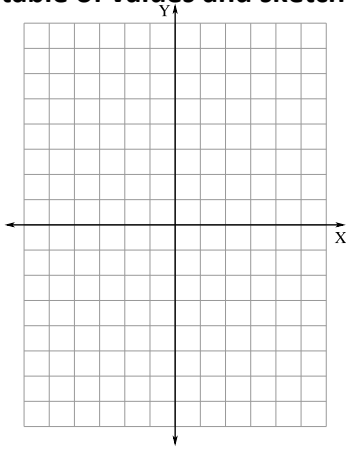
3c)

3d)

Now complete the table of values and sketch the curve on the axis provided

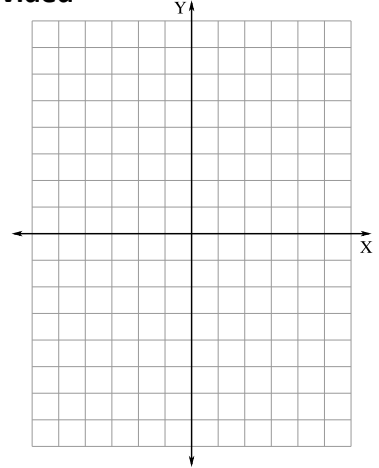
a) $f(x) = x^2 + 1$

x	f(x)
-2	
-1	
0	
1	
2	



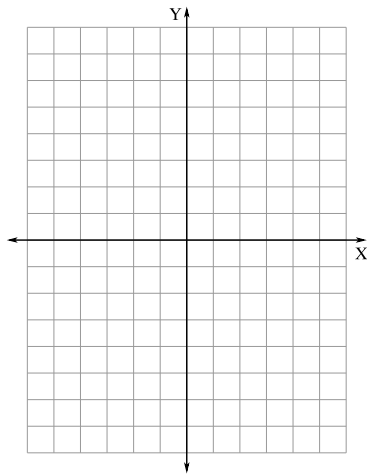
b) $f(x) = x^2 - 4$

x	f(x)
-2	
-1	
0	
1	
2	



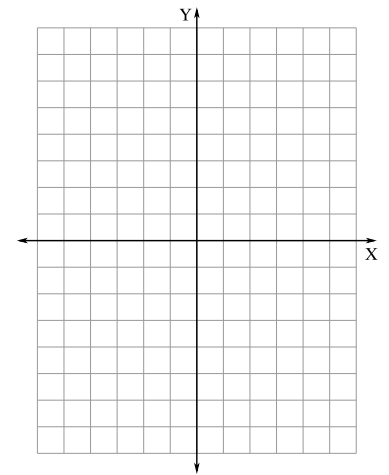
c) $f(x) = -x^2 + 1$

x	f(x)
-2	
-1	
0	
1	
2	



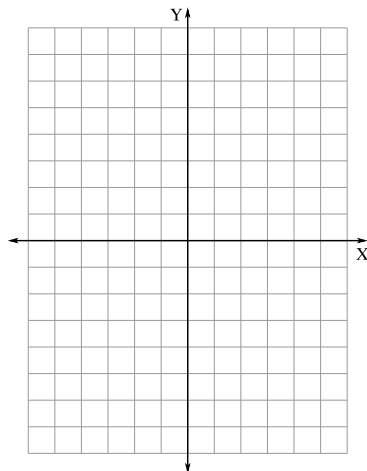
d) $f(x) = -x^2 + 3$

x	f(x)
-2	
-1	
0	
1	
2	



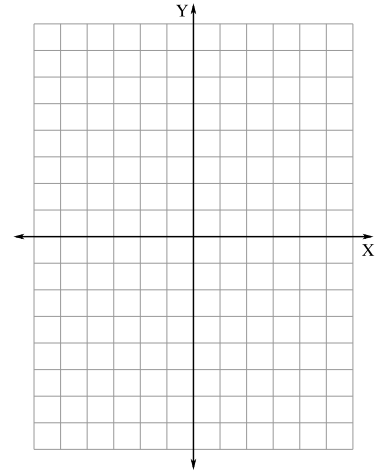
e) $f(x) = \frac{4}{x}$

x	f(x)
-4	
-2	
-1	
0	
1	
2	
4	



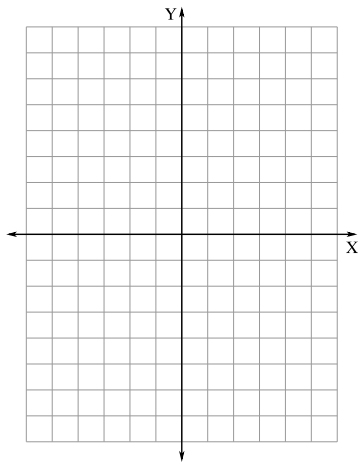
f) $f(x) = \frac{4}{x^2 + 1}$

x	f(x)
-4	
-2	
-1	
0	
1	
2	
4	



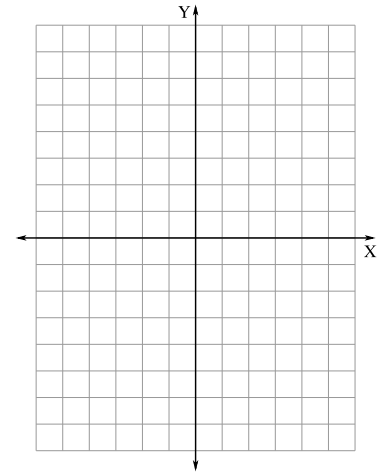
g) $f(x) = \frac{4}{x^2}$

x	f(x)
-4	
-2	
-1	
0	
1	
2	
4	



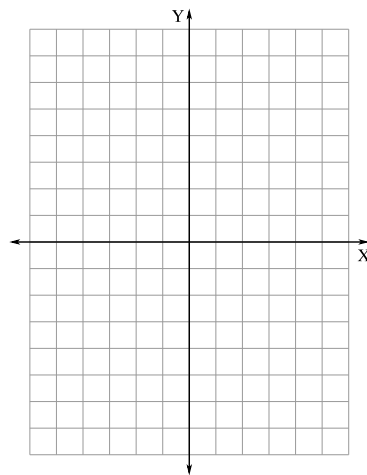
h) $f(x) = \frac{4}{x+1}$

x	f(x)
-4	
-2	
-1	
0	
1	
2	
4	



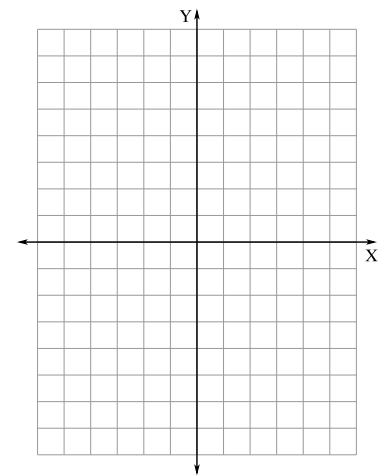
i) $f(x) = 2^x$

x	f(x)
-2	
-1	
0	
1	
2	
3	
4	



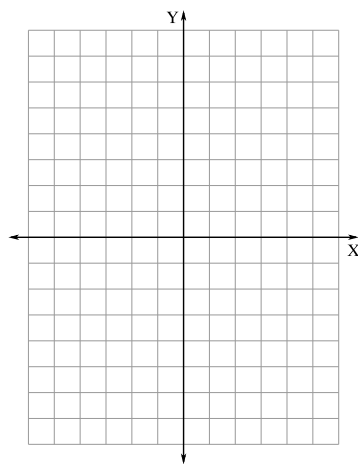
j) $f(x) = \sqrt[3]{x}$

x	f(x)
-8	
-2	
-1	
0	
1	
2	
8	



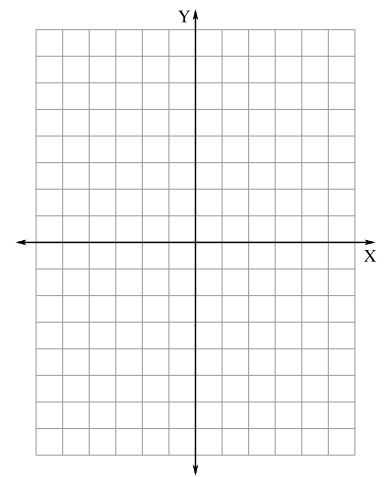
k) $f(x) = x^3 - 1$

x	f(x)
-2	
-1	
0	
1	
2	



l) $f(x) = \sqrt[2]{x}$

x	f(x)
-1	
0	
1	
4	
9	



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#7a) linear?

a) rate of change:

8b) linear:

rate of change:

b) linear?

b) rate of change:

9)