Functions:

$y = -2x + 17$

$g(x) = -2x + 17$

An equation: $2x + y = 17$

$-2x \quad -2x$

Two variables

Function notation:

$f(x) = 2x + 3$ (input)

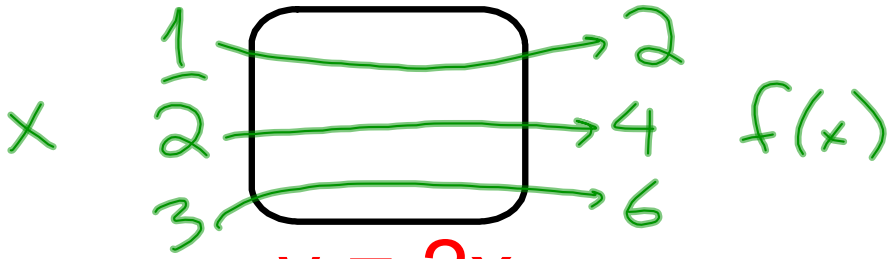
$y = 2x + 3$ (output)

Examples (in equation form)

What makes an equation a function?

IF I PUT A PARTICULAR "X" INTO A FUNCTION, I WILL ALWAYS GET THE SAME "F(X)" OUTPUT

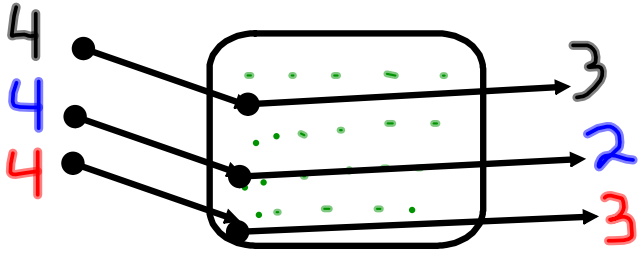
Functions are mathematical machines:



$y = 2x$

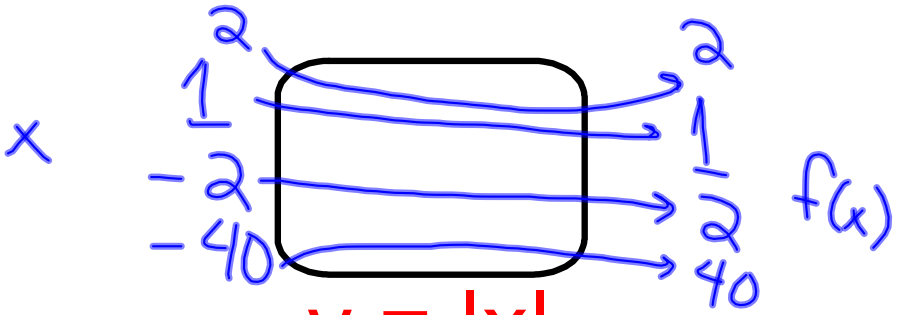
Is this a function?

NO!



input (x)

output (y)



$y = |x|$

NOT a function:

$y^2 = x$

$2^2 = 4$ $x = 4$, $y = 2$

$(-2)^2 = 4$ $x = 4$, $y = -2$

Is a function

$y = x - 4$

$x = 6$
$y = 2$

$x = 2$
$y = -2$

a function has an input of 7 and an output of 12.

give me an example of

a function that would do this

$f(x) = 12$ when $x = 7$

$f(x) = x + 5$

$12 = 7 + 5$

$f(x) = 2x - 2$

$f(7) = 2(7) - 2$

$f(7) = 14 - 2$

$f(7) = 12$

$f(x) = \frac{12}{7}x$

$f(x) = \frac{12 \cdot 7}{7}$

$f(x) = 12$

Some functions have a limited # of x values (inputs) that will work.

The list of possible x-values is called the "domain"

$f(x) = x - 2 \; ; \; x > 10$ Restricted by definition

$f(x) = \frac{2}{x} \; ; \; x \neq 0$ Restricted by function

$f(x) = x^2 - 7$ No restriction

The possible output values of a function are called the range.

y=|x| range: ?

domain	range
1	1
-1	1
0	0
-2	2
31	31

We can show functions as a table

domain: all #'s

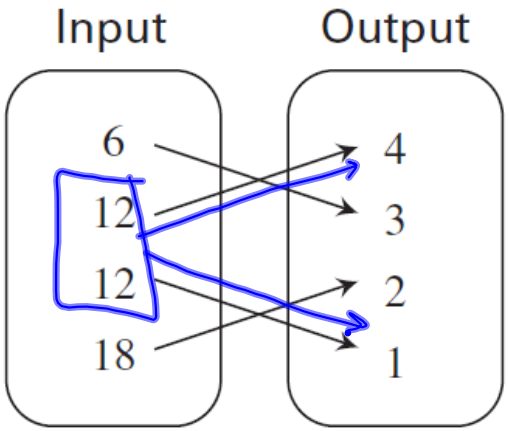
range: $f(x) \geq 0$

Input	Output
1	15
3	20
5	15
7	20

yes

Function? Or no function?

no



Shoe Sizes The table shows men's shoe sizes in the United States and Australia. Write a rule for the Australian size as a function of the United States' size.

U.S. size (x)	5	6	7	8	9	10
Australian size f(x)	3	4	5	6	7	8

$f(5)=3$

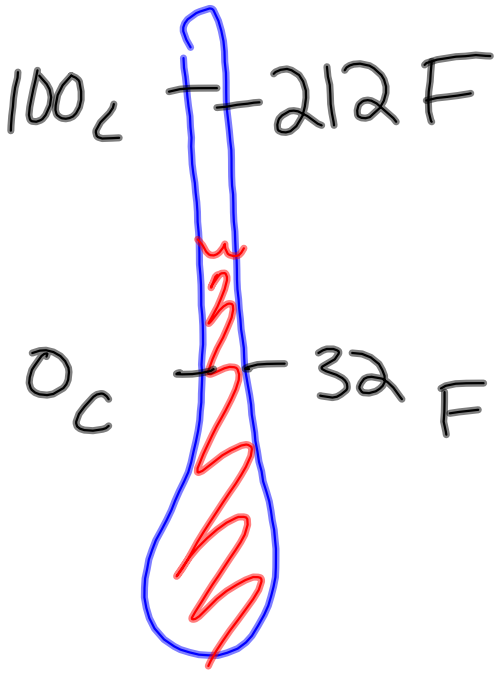
$f(6)=4$

$f(7)=5$

$\vdots$

$f(x)=?$

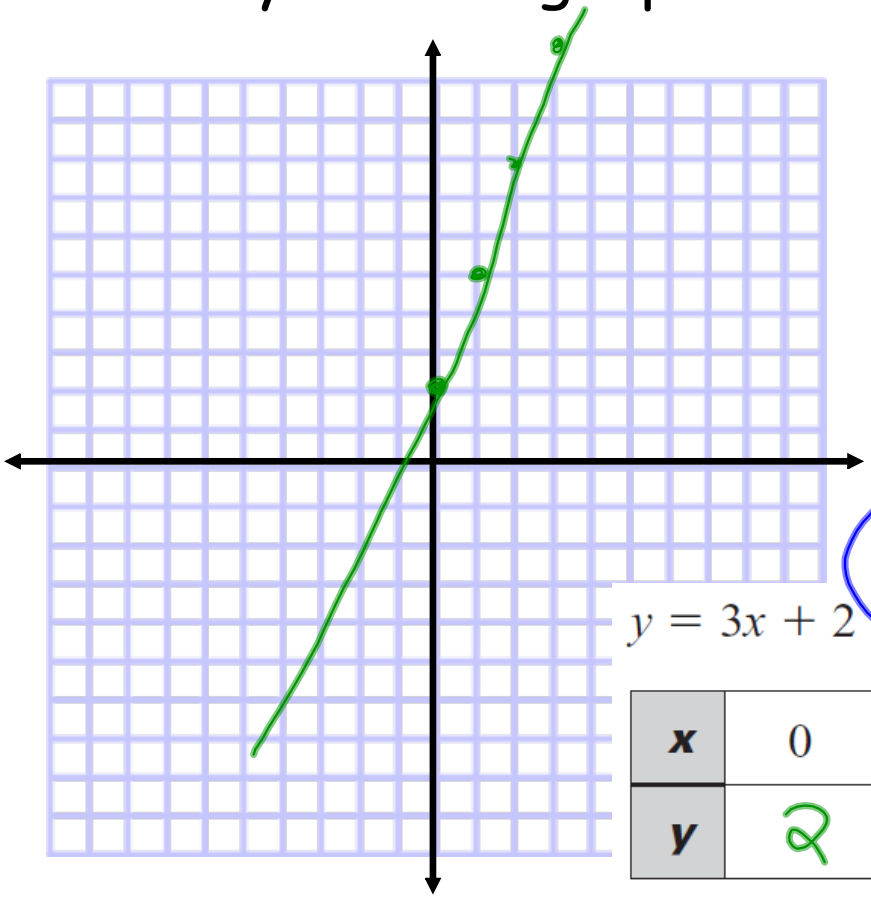
$f(x)=x-2$



$$F = \frac{9}{5}c + 32$$

$$f(c) = \frac{9}{5}c + 32$$

true functions can be graphed on an x-y axis - any vertical line will only hit the graph once (at most)

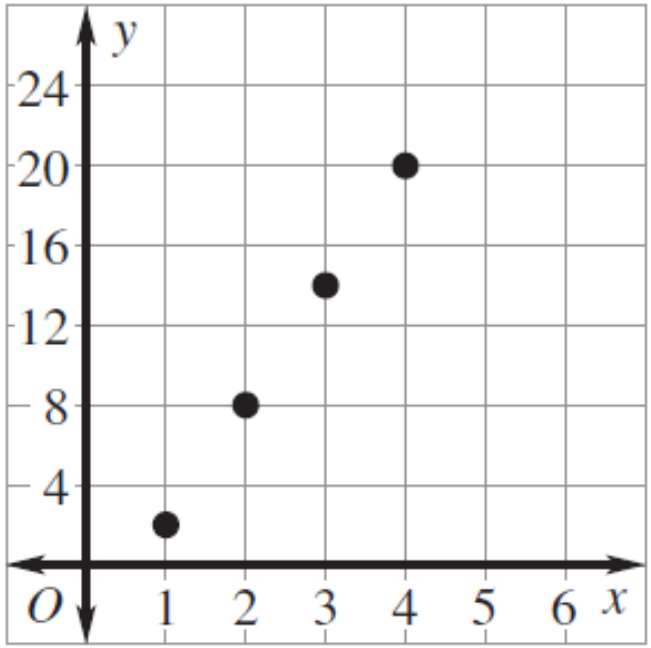


$y = 3x + 2$

IS A FUNCTION

x	0	1	2	3
y	2	5	8	11

What's the rule?



$f(x) = ?$

x	y
1	2
2	8
3	14
4	20

$f(x) = 6x - 4$

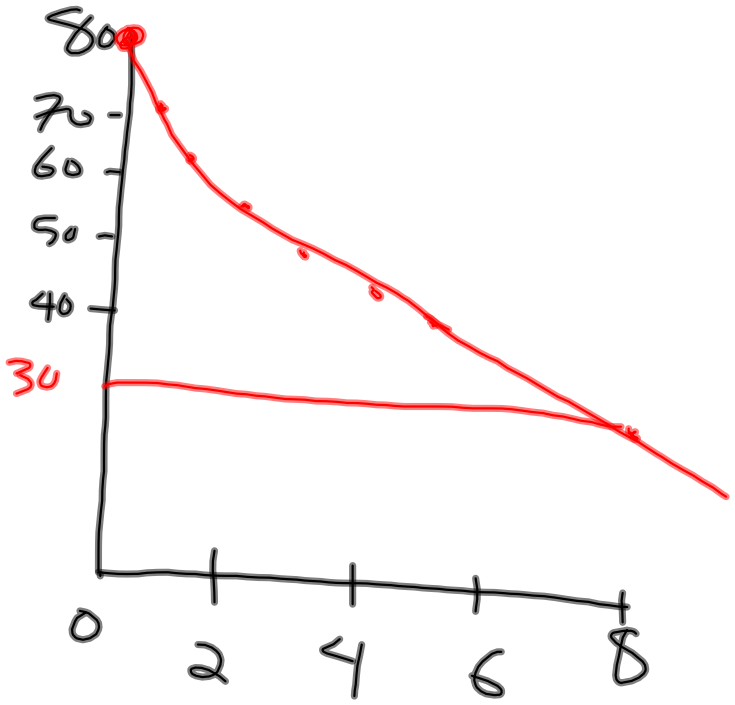
Metal Screws The table shows the number of threads per inch on a screw as a function of screw size.

Screw size number, *x*	0	1	2	3	4	5	6
Number of threads per inch, *y*	80	72	64	56	48	44	40

a. Graph the function.

b. Describe how the number of threads per inch changes as the screw size increases.

c. Would it be reasonable to expect a #8 screw to have 32 threads per inch? *Explain.*



Homework:

p. 38 4-18 (even), 24

p. 46 2-8 (even), 16, 19