

Chapter 1: Intro to Functions

we learned:

- difference between f_n and relation ✓
- f_n notation ✓
- domain and range
- graphing using transformations
- inverses
- The five parent f_n s.

A function has a 1 to 1 relationship with its independent variable (x) and the dependent variable (y).

→ if you plug in a value to x , you only get one answer.

ex: $y = 3x + 4$ ✓

$$x^2 + y^2 = 4 \quad \times$$

$$y^3 = 4x^2 - 5 \quad \checkmark$$

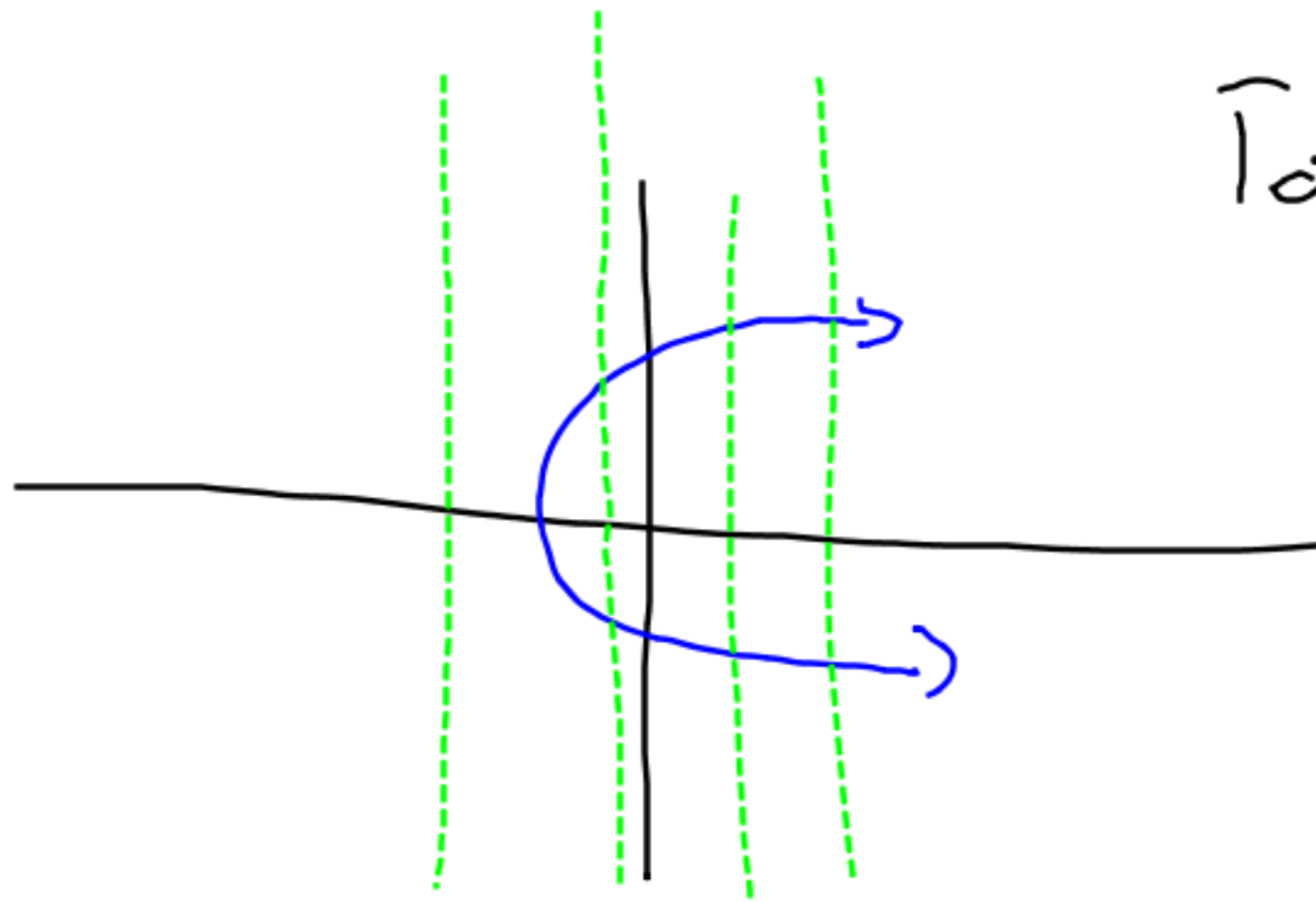
$$\sqrt[3]{8} = 2 \quad \sqrt[3]{-8} = -2$$

Therefore ~~if~~ y has an odd exponent, it is a f_n !

Even, not a f_n .

Graphically, we can tell by the

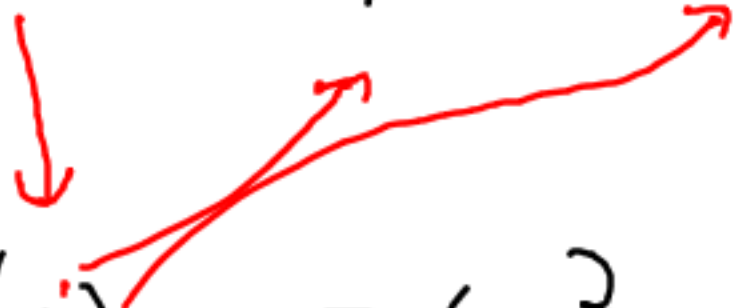
Vertical Line Test



Touches more than
once, $\therefore$ not a f_n .

Fn notation:

$$f(x) = 3x^2 + 2x - 1$$


$$f(3) = 3(3)^2 + 2(3) - 1$$

$$f(3) = 32$$

plug into x's

$$f(\boxed{x+2})$$

$$= 3(x+2)^2 + 2(x+2) - 1$$

expand + simplify

$$f(x) = 3x + 1 \quad g(x) = 2 - x$$

$$b) \quad f(a^2) = g(2a)$$

$$3a^2 + 1 = 2 - 2a \quad \text{solve for } a.$$

$$3a^2 + 2a - 1 = 0$$

$$(3a - 1)(a + 1) = 0$$

$$a = \frac{1}{3}$$

$$a = -1$$

$$\underline{f(x)} = -3x + 8$$

- Find x so that $f(x) = 20$

- $f(x) = 20$, what is x ?


$$20 = -3x + 8$$

$$12 = -3x$$

$$-4 = x$$

$$\therefore f(-4) = 20$$


$$f(x) = -2\sqrt{-\frac{1}{3}x - 2} + 4$$

$$f(x) = -2\sqrt{-\frac{1}{3}(x + 6)} + 4$$

a k d c

① V. Str of -2

② H. Str of -3

③ V. Sh of $+4$

④ H. Sh of -6

x	y
0	0
1	1
4	2
9	3
16	4

$-3x - 6$	$-2y + 4$
-6	4
-9	2
-18	0
-33	-2
-54	-4

Graph these



$$f(x) = -2\sqrt{-\frac{1}{3}(x+6)} + 4$$

$$\text{Domain: } \left\{ x \in \mathbb{R} \mid x \leq -6 \right\}$$

$\begin{matrix} \leq - \\ \geq + \end{matrix}$

Value = H. Sh.

Range:

$$\left\{ f(x) \in \mathbb{R} \mid f(x) \leq 4 \right\}$$

Inverses: $f(x) = -2\sqrt{\frac{-1}{3}(x+6)} + 4$

$+6$	-6	
$\times \frac{-1}{3}$	$\div \frac{-1}{3} = x - 3$	
$\sqrt{}$	$()^2$	
$\times -2$	$\div -2$	
$+4$	-4	

$$f^{-1}(x) = -3 \left(\frac{x-4}{-2} \right)^2 - 6$$

$$= -3 \left(\frac{-1}{2} (x-4) \right)^2 - 6$$

~~$$= -\frac{3}{4} (x-4)^2 - 6$$~~