

Section 2.3: More Functions

Note Title

6/26/2009

Until Now: $f(x) = mx + b$

$$f(x) = ax^2 + bx + c, \quad a \neq 0$$

- Today:
- ① Power Functions
 - ② Root Functions
 - ③ Absolute Value Functions
 - ④ Piecewise

① Power Functions n ← some power

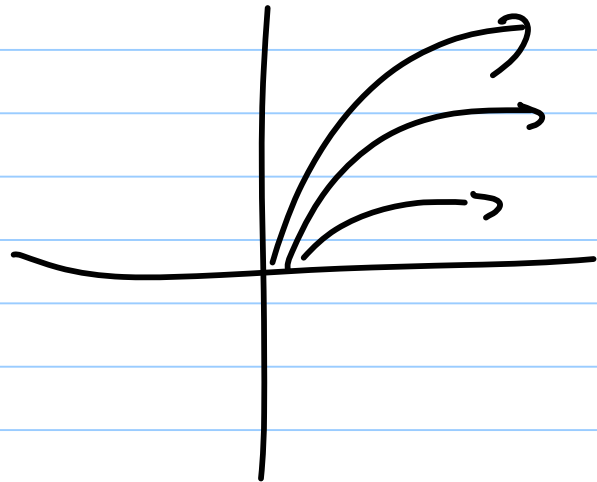
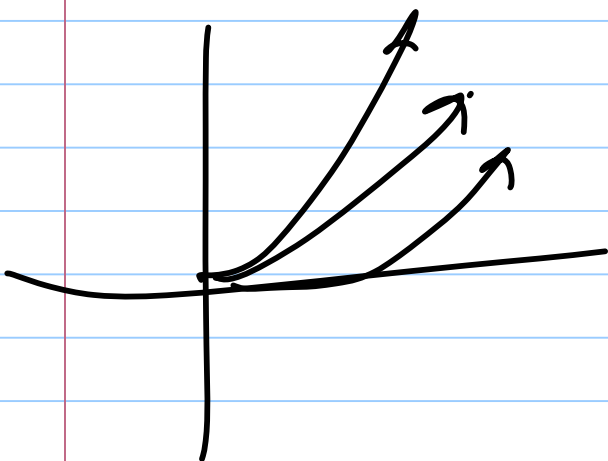
$$f(x) = a x^n$$

Some
constant.

$$f(x) = -2x^{1.3}$$

$$g(x) = 2x^3 \text{ or } h(x) = -2x^4$$

How do they look?



Ex] Given $f(x) = 2.698 x^{1.3}$

Find $f(2)$.

$$f(2) = 2.698 (2^{1.3})$$

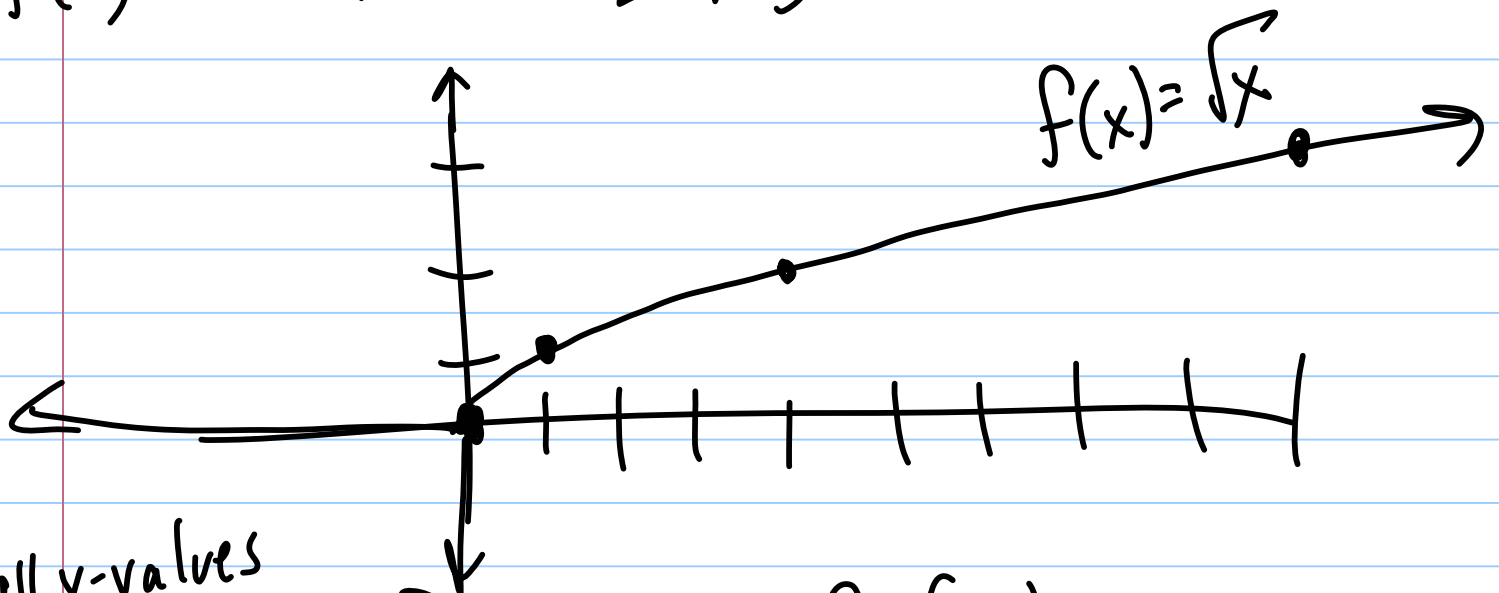
$$f(2) \approx \underline{6.643}$$

(2) Root Functions (type of power function)

a) $f(x) = x^{1/2} = \sqrt{x}$

Graph of $f(x) = x^{1/2} = \sqrt{x}$

x	0	1	4	9
f(x)	0	1	2	3



(all x-values you are allowed to plug in)

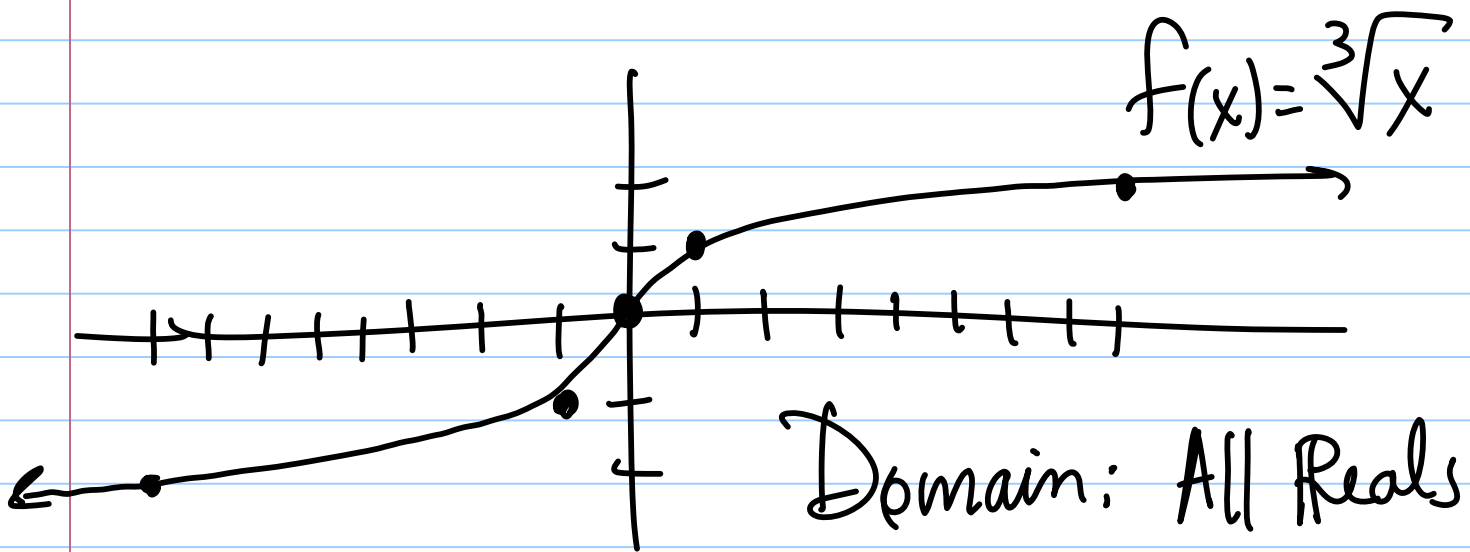
→ Domain of $f(x) = x \geq 0$

Range of $f(x) = y \geq 0$

Set of all y-values

$$b) f(x) = x^{1/3} = \sqrt[3]{x}$$

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



Domain: All Reals

Range: All Reals

Sometimes power on x is negative:

$$A(x) = 4.5 + \frac{1000}{x}$$

↖ This is the average cost of making photo albums, where x is the # of albums produced.

If 500 albums are produced, what is the average cost per album?

Answer: \$6.50

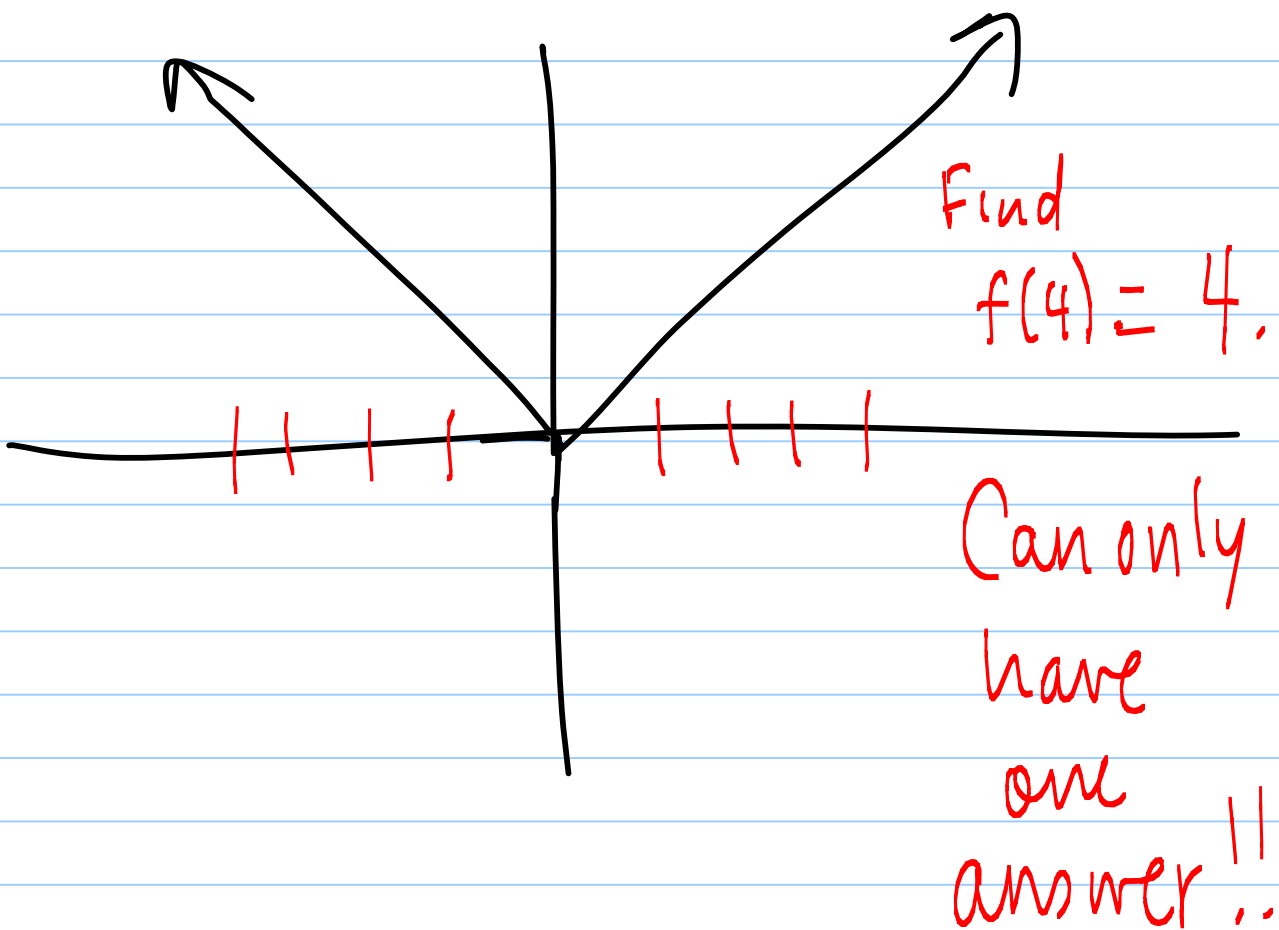
③ Absolute Value function

$$f(x) = |x|.$$

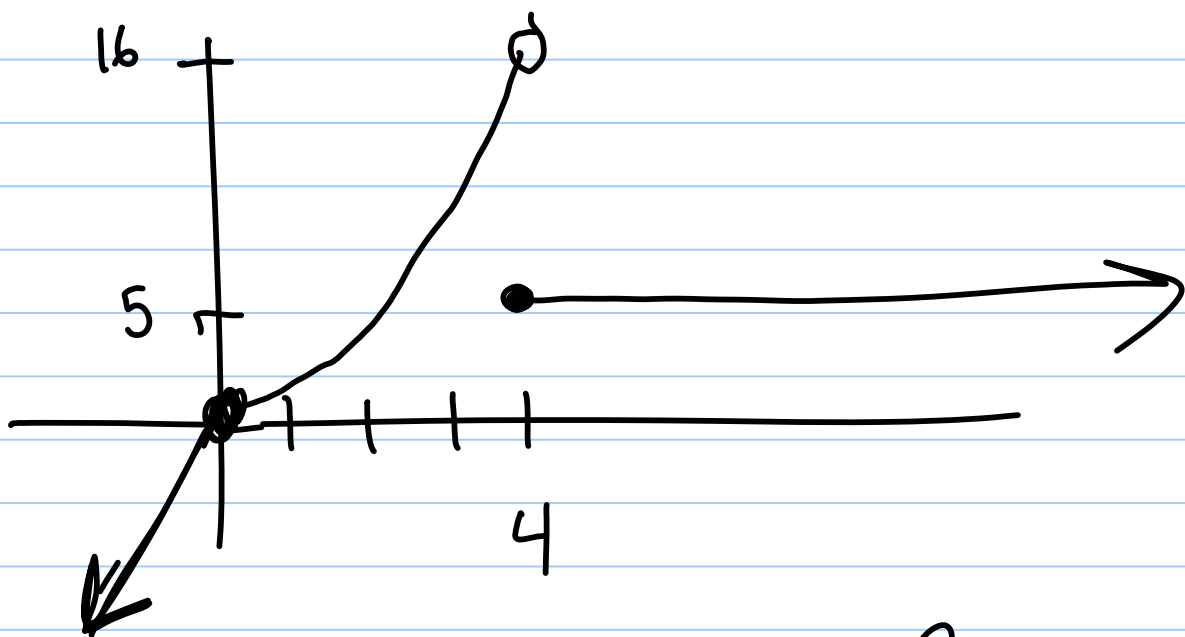
$f(x)$ is defined in the following way:

$$f(x) = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

↖ "piecewise function"



$$\text{Ex] } f(x) = \begin{cases} x, & x < 0 \\ x^2, & 0 \leq x < 4 \\ 5, & x \geq 4 \end{cases}$$



~~$$f(7)? \quad f(7) = 5$$~~

~~$$f(3)? \quad f(3) = 9$$~~

MONTHLY USAGE (in kilowatt-hours)	MONTHLY CHARGE
0-100	\$10 plus \$0.02 per kilowatt-hour
More than 100, up to 500	\$15 plus \$0.03 for every kilowatt-hour over 100
More than 500, up to 1000	\$20 plus \$0.04 for every kilowatt-hour over 500

Create a piecewise function, $C(x)$ that gives the monthly cost of electricity based on x kw hours of usage.