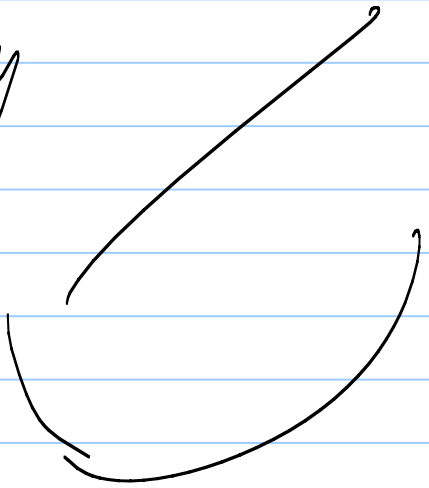
More Functions (Section 3.3)

Note Title 9/30/2009

Previously



Linear

Quadratic Functions

Combinations Avg. Cost = $\frac{\text{Total Cost}}{\#\text{ items}}$

Profit = Revenue − Cost

Power Functions

$f(x) = ax^r$

a: some constant

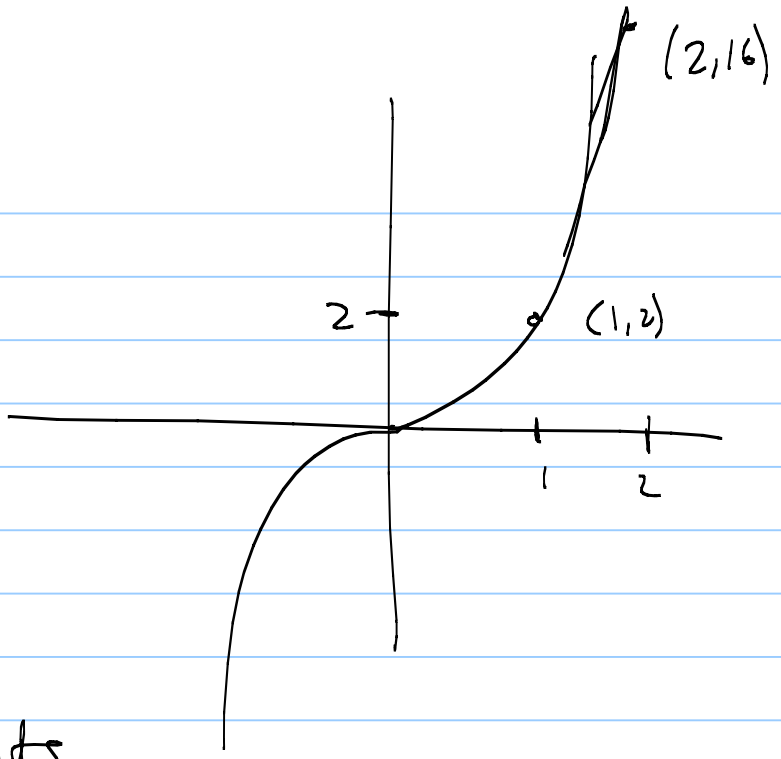
r: some constant

Example $f(x) = 2x^3$

$f(x) = 2x^3$

$2 \cdot 1^3 = 2 \cdot 1 = 2$

$2 \cdot 2^3 = 2 \cdot 8 = 16$



Rules of Exponents

$$X^2 \cdot X^3 = \underbrace{X \cdot X}_{X^2} \cdot \underbrace{X \cdot X \cdot X}_{X^3} = X^5$$

$$2 + 3 = 5$$

General Rule $X^a \cdot X^b = X^{a+b}$

$\sqrt{X} = X^r$

$\sqrt{X} \cdot \sqrt{X} = X$

$X^r \cdot X^r = X^1$

$r + r = 1$

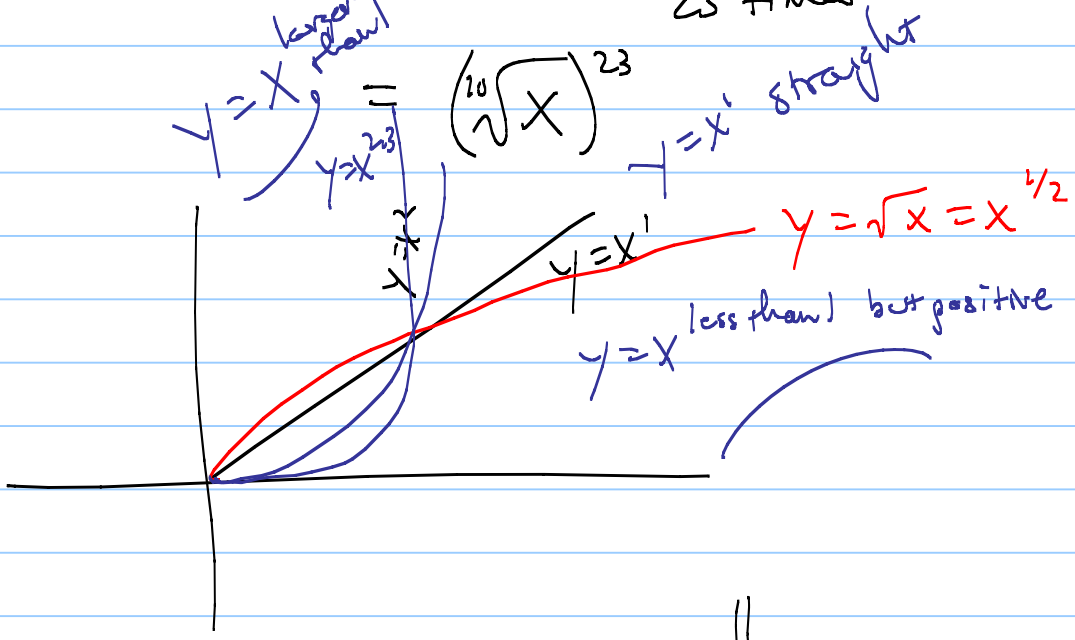
$\sqrt{X} = X^{1/2}$

$r = \frac{1}{2}$

$$\sqrt[3]{x} = x^{1/3}$$

$$x^{2.3} = x^{23/10} = \underbrace{x^{1/10} \cdot x^{1/10} \cdots \cdot x^{1/10}}_{23 \text{ times}}$$

$$= \left(\sqrt[10]{x}\right)^{23}$$



$$\frac{1}{x} \cdot x^2 = x$$

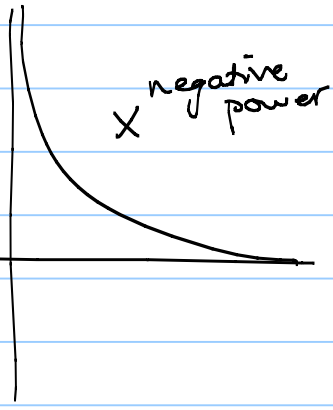
$$x^r \cdot x^2 = x^1$$

$$r + 2 = 1$$

$$r = -1$$

$$\frac{1}{x} = x^{-1}$$

$$\frac{1}{x^2} = x^{-2}$$



Evaluate $f(2.7)$

$f(x) = 3x^{1.3}$

Use $\wedge$ button on calculator

Absolute Value Function

$f(x) = |x|$

$f(2) = |2| = 2$

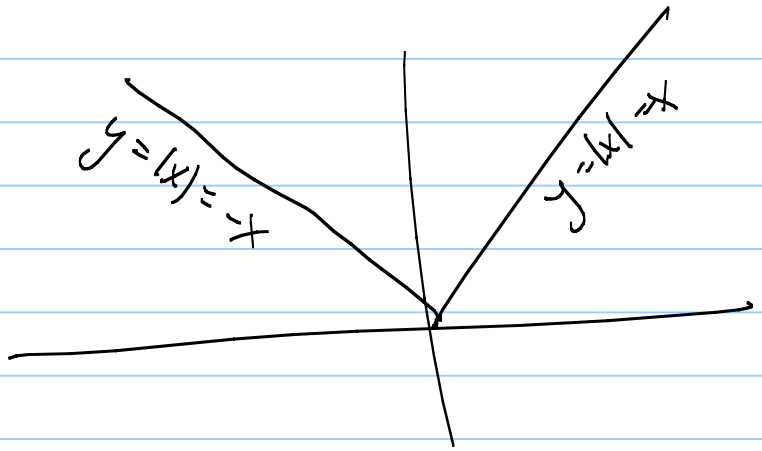
$f(-2) = |-2| = 2$

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

$f(-1) = (-1)^{1/2}$

$= \sqrt{-1}$

TROUBLE

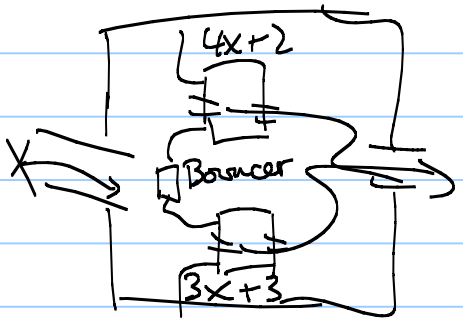


Piecewise Functions

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

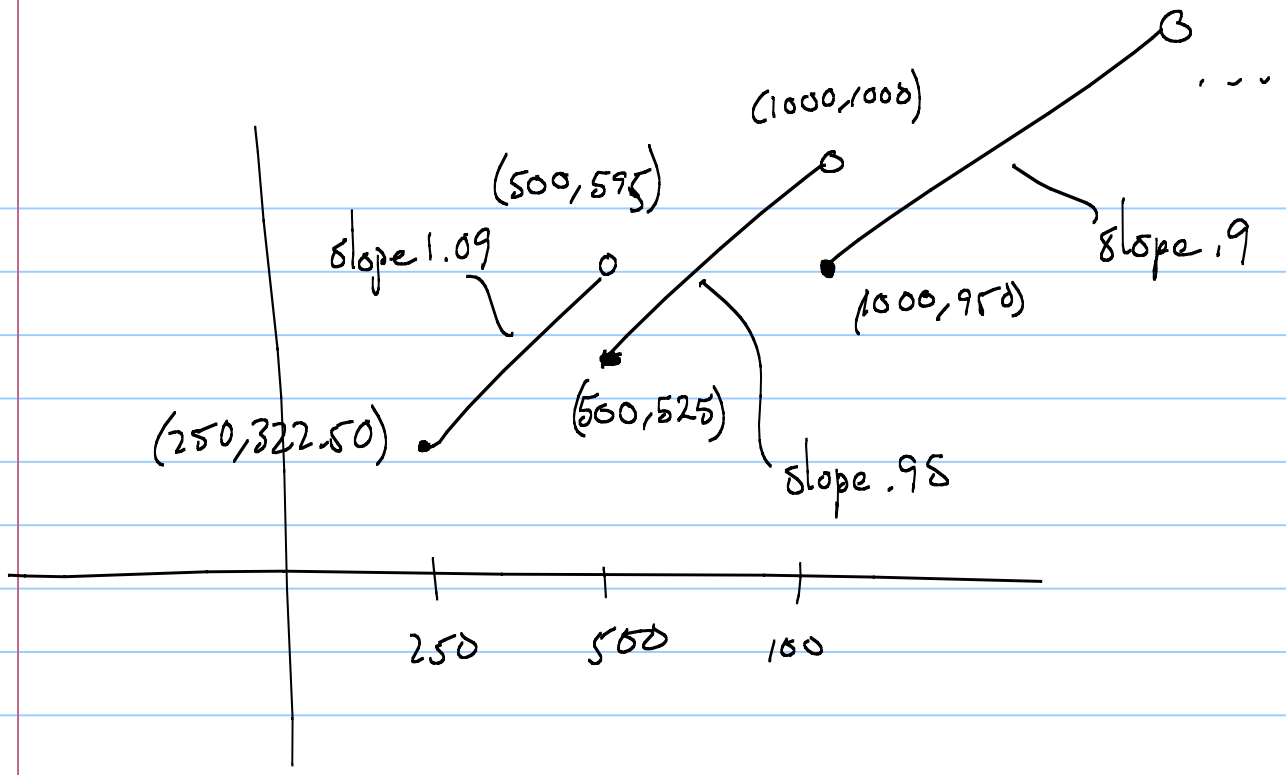
Another example

$$f(x) = \begin{cases} 4x+2 & x > 1 \\ 3x+3 & x \leq 1 \end{cases}$$



$f(2) = 4 \cdot 2 + 2 = 10$ // $f(-3) = 3(-3)+3 = -9+3 = -6$

$$f(x) = \begin{cases} 1.09x + 50 & 250 \leq x < 500 \\ .95x + 50 & 500 \leq x < 1000 \\ .9x + 50 & 1000 \leq x < 2500 \\ .85x + 50 & 2500 \leq x < 5000 \\ .79x + 50 & 5000 \leq x \end{cases}$$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slope .9
(1000,950)
(500,525)
(250,322.50)
slope .95
250
500
100