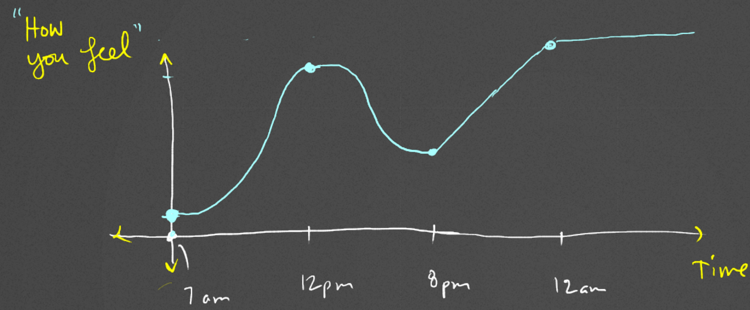
What is a function?

- a dependence of one variable on another.
- assignment of a single real number to a given real number.
- input/output machines

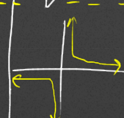
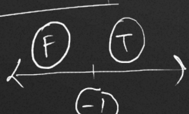
- Example of a graph of a function.



Ex. Amount of money you earn (in one week) is a function of time worked.

dependendent varible — Amount of money

independent varible — time worked

DOMAIN: set of allowable inputs		RANGE: set of obtainable outputs
24 · 7 = 168 hours in a week $[0, 168]$	Example Above	$[0,\infty)$ No limit to how much one could earn.
$(-\infty,\infty)$	$f(x) = 3x$	 $(-\infty,\infty)$
① $\mathbb{R}-\{0\}$ or ② $(-\infty,0)\cup(0,\infty)$	$f(x) = \frac{3}{x}$	 $\mathbb{R}-\{0\}$
Domain: (avoid - • square roots of negative • division by 0) $\boxed{\frac{5}{x+1} \geq 0}$  $(-1,\infty)$	$g(x) = \sqrt{\frac{5}{x+1}}$	Range: Same range as $\frac{5}{x}$ or $\frac{1}{x}$ $(-\infty,0)\cup(0,\infty)$

Function Evaluation —— "pluggins in"

Ex.

$f(x) = x^2$

$f(0)$ means "f at zero" means (plug 0 in for x)

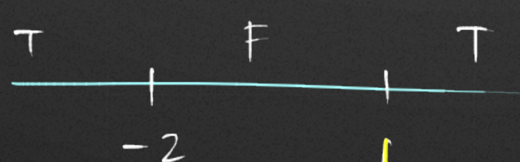
$f(0) = 0$

$f(a) = a^2$

$f(a+h) = (a+h)^2 = a^2 + 2ah + h^2$

Functions	Domain	Range	Evaluations
$f(x) = x^2 + 1$	$(-\infty, \infty)$	$[1, \infty)$	$f(-3) = (-3)^2 + 1 = 10$
$g(x) = \frac{x+1}{x-3}$	$x - 3 \neq 0$ $x \neq 3$ $\mathbb{R} - \{3\}$		$g(14) = \frac{15}{11}$
$h(x) = \sqrt{x+2}$	$x + 2 \geq 0$ $x \geq -2$	$[0, \infty)$	$h(a-2) = \sqrt{a-2+2}$ $= \sqrt{a}$
$f(x) = \sqrt{\frac{x+2}{x-1}}$	$(-\infty, -2] \cup (1, \infty)$	$[0, \infty)$	$f(2) =$

$\frac{x+2}{x-1} \geq 0$



Last Time - Functions, domain, range, evaluation

Recall - Warm-Up -

1. what's the domain of $f(x) = \sqrt{\dfrac{x-1}{x+2}}$? It is the solution to $\dfrac{x-1}{x+2} \geq 0$.

Find C.P.'s: $x = 1$ & $x = -2$

or $(-\infty, -2) \cup [1, \infty)$

2. Assume $f(x) = x^2$

Evaluate $\dfrac{f(a+h) - f(a)}{h} = \dfrac{(a+h)^2 - a^2}{h}$

$$= \frac{a^2 + 2ah + h^2 - a^2}{h} = \frac{2ah + h^2}{h} = \frac{\cancel{h}(2a + h)}{\cancel{h}}$$

$$= 2a + h$$

3. $f(x) = \sqrt{x}$. Evaluate $\dfrac{f(a+h) - f(a)}{h}$

$$\left(\frac{\sqrt{a+h} - \sqrt{a}}{h}\right) \cdot \frac{\left(\sqrt{a+h} + \sqrt{a}\right)}{\left(\sqrt{a+h} + \sqrt{a}\right)}$$

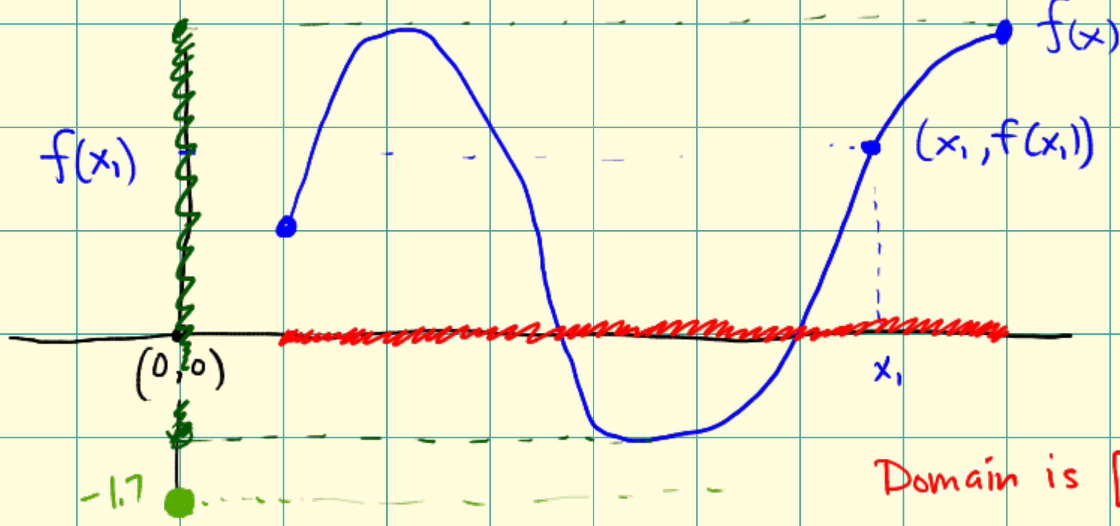
Rationalize Numerator

$$\frac{(a+h) + \overbrace{\sqrt{a}\sqrt{a+h} - \sqrt{a}\sqrt{a+h}}^{0} - a}{h\left(\sqrt{a+h} + \sqrt{a}\right)} = \frac{a + h - a}{h\left(\sqrt{a+h} + \sqrt{a}\right)}$$

$$= \frac{\cancel{h}}{\cancel{h}\left(\sqrt{a+h} + \sqrt{a}\right)}$$

$$\frac{1}{\sqrt{a+h} + \sqrt{a}}$$

Q: what is the domain of f(x)? Range?



Domain is [1, 8]

Range of f(x):
set of obtainable outputs, or set of heights obtained by graph

[-1, 3]

Functions assign a single (unique) number to every given number.

$y = \pm\sqrt{x}$ is not a function of x.

Because if 4 is the input, ± 2 is output

Sometimes equations define functions —

$x^2 + 3y = 8$ (an equation)

By algebraic manipulation —

$$y = \frac{8 - x^2}{3} = -\frac{1}{3}x^2 + \frac{8}{3}$$

— y is a function of x —

Other times this isn't true —

$y^2 + 3x = 8$ here y is not a function of x.

$y^2 = 8 - 3x$

$y = \pm\sqrt{8-3x}$

Practice: Q: is y a function of x?

- $y^3 + x - 1 = 0$

  $y^3 = 1 - x \Rightarrow y = (1-x)^{1/3}$

  Yes

  cube root
  no +/–

  $y = \sqrt[3]{8}$
  $\Rightarrow y = 2$

- $x^2 y + y = 1$

$y(x^2+1) = 1$

$y = \frac{1}{x^2+1}$

Yes!

or

$$\frac{x^2 y + y}{y} = \frac{1}{y}$$

$$\frac{x^2+1}{1} = \frac{1}{y}$$

$$\frac{1}{x^2+1} = y$$

Function Composition

price @ pump is a function of

cost of gas " a function of

supply, demand, instability ...

suppose

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

$g(x) = x^3 - 2$

$h(x) = \frac{1}{\sqrt{x}}$

$f\left(h(x)\right)$ means plug $h(x)$ into the "x" of $f(x)$.

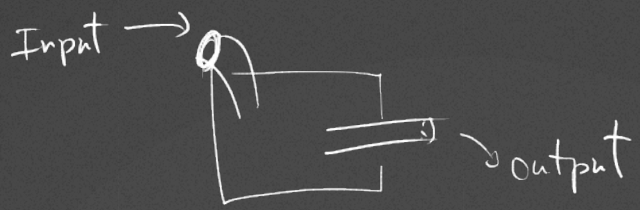
i.e.,

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

$$= \left(\frac{1}{\sqrt{x}}\right)^2 + 1$$

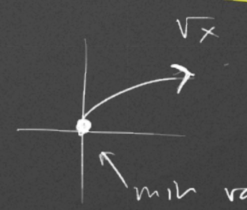
$$= \frac{1}{x} + 1$$

FUNCTIONS: machine which assigns a <u>unique</u> output a given input.



For example: $f(x) = \pm x$ is not a function.
this is not a unique output.

Examples: The price you pay at the gas pump is a function of the cost of gas.

DOMAIN: set of allowable inputs	Functions	RANGE set of obtainable outputs.
$\mathbb{R} - \{0\}$ or $(-\infty, 0) \cup (0, \infty)$	accident these are same $f(x) = \frac{1}{x}$	$\mathbb{R} - \{0\}$
$\mathbb{R}$	$g(x) = x^2 + 1$	$[1, \infty)$
This domain is the solution to $\frac{x-1}{x+5} \geq 0$ ... find C.P.'s are $x = 1$, $x = -5$	$h(x) = \sqrt{\frac{x-1}{x+5}}$ $h(-4.999999999)$	 $[0, \infty)$

T F T

$-5 \quad 1$

$= (-\infty, -5) \cup [1, \infty)$

$\frac{-6}{.00000001}$

Evaluating Functions

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

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

$g(x) = x^2$, $g(0)$, $g(-1)$

$$\boxed{\frac{g(a+h) - g(a)}{h}} = \frac{(a+h)^2 - a^2}{h} = \boxed{\frac{a^2 + 2ah + h^2 - a^2}{h}}$$

$$\frac{2ah + h^2}{h}$$

$$= \frac{\cancel{h}(2a+h)}{\cancel{h}}$$

$$= 2a + h$$

$g(☺) = ☺^2$

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

$f(x) = \sqrt{x}$. Compute $\dfrac{f(a+h) - f(a)}{h}$

$f(a+h) = \sqrt{a+h}$

$f(a) = \sqrt{a}$

$$= \left(\frac{\sqrt{a+h} - \sqrt{a}}{h}\right) \cdot \frac{(\sqrt{a+h} + \sqrt{a})}{(\sqrt{a+h} + \sqrt{a})}$$

$$\frac{a + h \underbrace{+ \sqrt{a}\sqrt{a+h} - \sqrt{a}\sqrt{a+h}}_{0} - a}{h(\sqrt{a+h} + \sqrt{a})} = \frac{\cancel{h}}{\cancel{h}(\sqrt{a+h} + \sqrt{a})}$$

$$= \frac{1}{(\sqrt{a+h} + \sqrt{a})}$$

6 8

Name:
Exam 2 :: Math 111 :: October 7, 2015

1. A car rental company offers two plans for renting a car.

   Plan A: 30 dollars ~~per day~~ and 17 cents per mile.
   Plan B: 50 dollars ~~per day~~ with unlimited mileage.

   For what range of miles will plan B save you money?

$(117, \infty)$

$x = \#$ miles,

$$50 < 30 + .17x$$

$$20 < .17x$$

$$117_{\text{miles}} = \frac{20}{.17} < x$$

2. If the circumference of a circle is 10 inches more than its diameter, then what is its area?

$$\boxed{2\pi r} = C = 10 + d = \boxed{10 + 2r}$$

$-2r \qquad -2r$

$$2r(\pi - 1) = 2\pi r - 2r = 10$$

so $\quad r = \frac{10}{2(\pi-1)} = \frac{5}{\pi - 1}$

$$A = \pi r^2$$
$$= \pi\left(\frac{5}{\pi-1}\right)^2$$
$$\approx 17.$$

3. Find all real solutions to:

(a)

$$\underbrace{x^2 - 8x - 48} = 0$$

$$(x-12)(x+4) = 0$$

$x - 12 = 0$ $\quad$ $x = 12$

$x + 4 = 0$ $\quad$ $x = -4$

(b)

$x^2 - 16x - 10 = 0$ (by completing the square)

$\left(\frac{b}{2a}\right)^2$

$\left(\frac{16}{2}\right)^2$

$+10 \quad +10$

$$x^2 - 16x + 64 = \underbrace{10 + 64}$$

$$(x-8)^2 = 74$$

$$x - 8 = \pm\sqrt{74}$$

$$x = 8 \pm \sqrt{74}$$

bogus!

$x - 8 = 74$

$(x-8)(x-8) = 74$

$x \cdot y = 74$ does not mean

$x = 74$ or $y = 74$

(c)

$x^6 - 9x^3 + 18 = 0$ (find the exact solutions - no decimals)

$$(x^3-6)(x^3-3) = 0$$

$$x^3 - 6 = 0, \quad x^3 - 3 = 0$$

$$(x^3)^{\frac{1}{3}} = (6)^{\frac{1}{3}} \quad (x^3)^{\frac{1}{3}} = (3)^{\frac{1}{3}}$$

$$x = \sqrt[3]{6}, \quad x = \sqrt[3]{3}$$

remember study guide problem –

$$x - 9\sqrt{x} + 18 = 0$$

$$(\sqrt{x} - 6)(\sqrt{x} - 3) = 0$$

$\sqrt{x} - 6 = 0$ | $\sqrt{x} = 3$

$\sqrt{x} = 6$ | $x = 9$

$x = 36$

Find solutions to

$x \cdot y = 6$

- $x = 3, y = 2$
- $x = 1, y = 6$
- $x = \sqrt{6}, y = \sqrt{6}$
- $x = 100$, $y = \frac{6}{100}$

$x = 12, \; y = \frac{1}{2}$

$x \cdot y = 5$

same goes here

$x = 3 \quad y = \frac{5}{3}$

$x = 50 \quad y = \frac{1}{10}$

sols $\quad x \cdot y = 0$

$x = 0$, $y = 0$	$x = 0$, $y = 115$	$y = 0$, $x = 1$

$$(A-B)^2 = A^2 - B^2$$

4. Find all real solutions to:

(a)

$$5x^4 - 4x^3 - 1x^2 = 0$$

$x^2(5x^2 - 4x - 1) = 0$

Two "terms" multiply giving 0

$\Rightarrow x^2 = 0$, $x = 0$

or

$5x^2 - 4x - 1 = 0$

$x = \frac{4 \pm \sqrt{16 - 4 \cdot 5 \cdot (-1)}}{2 \cdot 5}$

$= \frac{4 \pm \sqrt{36}}{10}$

$= \frac{4 \pm 6}{10}$

$= \frac{10}{10}$ or $\frac{4-6}{10} = \frac{-2}{10}$

1 , $-.2$

(b)

$$9\sqrt{x} - 5\sqrt{x} = \frac{2}{3}x$$

$(4\sqrt{x})^2 = \left(\frac{2}{3}x\right)^2$

$\frac{9}{4} \cdot 16x = \frac{9}{4}\frac{4}{9}x^2 \Rightarrow 36x = x^2$

$x^2 - 36x = 0$

$x(x - 36) = 0$

$x = 0$

$x = 36$

(c) Goal: Find the solutions to the equation.

$$\frac{1}{x-2} - \frac{2}{x+2} = -\frac{3}{4-x^2}$$

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

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

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

$(x-2)(x+2)$

$= $

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

Because this is an equation – you can clear the denominators

Multiply both sides by $(x^2 - 4)$

$\rightarrow (x+2) - 2(x-2) = 3$

$x + 2 - 2x + 4 - 3 = 0$

$-x + 3 = 0 \Rightarrow x = 3$

5. Solve each inequality $\frac{7}{7-6} \geq \frac{7}{1}$ $(-\infty, 0) \cup (6, 7]$

(a)

$$\frac{x}{x-6} \geq \frac{x}{1}$$

$$\frac{x}{x-6} - \frac{x}{1}\left(\frac{x-6}{x-6}\right) \geq 0$$

$$\frac{x - x^2 + 6x}{x-6} = \frac{-x^2 + 7x}{x-6} \geq 0$$

C.P.'s

$-x^2 = -7x$

$\Rightarrow x = 0$ or $x = 7$

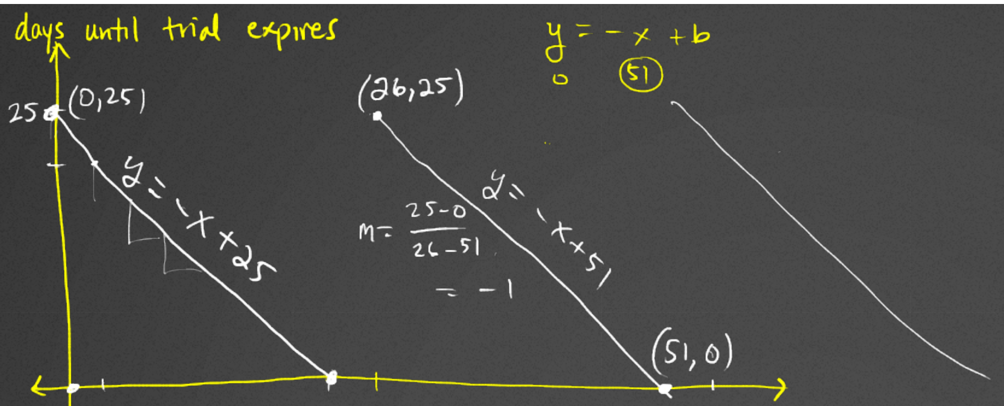
$x - 6 = 0$

$x = 6$

(b) $|2x - 1| > 15$

(c) $5x - 12 \leq 17x + 1$

6. I tell my friends that this class ________________________________.



$y = -x + b$

0 51

the

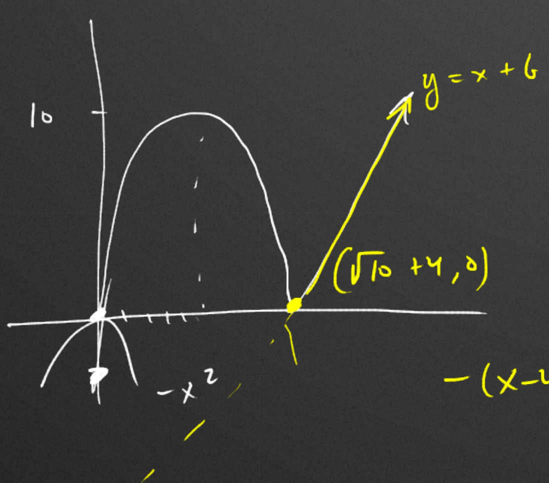
day = 0
when I
downloaded
Curio

piecewise functions:

$$f(x) = \begin{cases} -x + 25 & \text{if } 0 \le x \le 25 \\ -x + 51 & \text{if } 26 \le x \le 51 \end{cases}$$

$f(1) = -(1) + 25 = 24$ b/c $0 \le 1 \le 25$

$f(50) = -50 + 51 = 1$ $\quad 25 \le 50 \le 51$



$$f(x) = \begin{cases} -(x-4)^2 + 10 & \text{if } 0 \le x < \sqrt{10} + 4 \\ x - (\sqrt{10} + 4) & \text{if } x > \sqrt{10} + 4 \end{cases}$$

$-(x-4)^2 + 10 = 0$

$(x-4)^2 = 10 \Rightarrow x = \sqrt{10} + 4$

$f(0) = -6$

$f(10) = 10 - (\sqrt{10} + 4)$

$f(x) = x^3$ Avg R. of CL

$(-1, 1)$ means the interval b/w $(\underset{a}{-1}, \underset{b}{1})$

$(2, 3)$

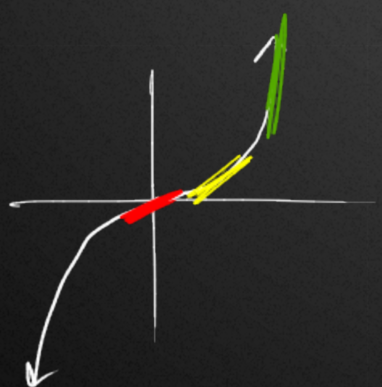
$(3, 4)$

$$\frac{f(b) - f(a)}{b - a}$$

①
$$\frac{f(1) - f(-1)}{1 + 1} = \frac{1 - (-1)}{1 + 1} = \frac{2}{2} = \underline{1}$$

②
$$\frac{f(3) - f(2)}{3 - 2} = \frac{27 - 8}{1} = \underline{19}$$

③
$$\frac{4^3 - 3^3}{4 - 3} = \underline{3}7$$



increasing

Increasing: whenever $x < y$, $f(x) < f(y)$

Decreasing: whenever $x < y$, $f(y) < f(x)$

A.R. of C. on

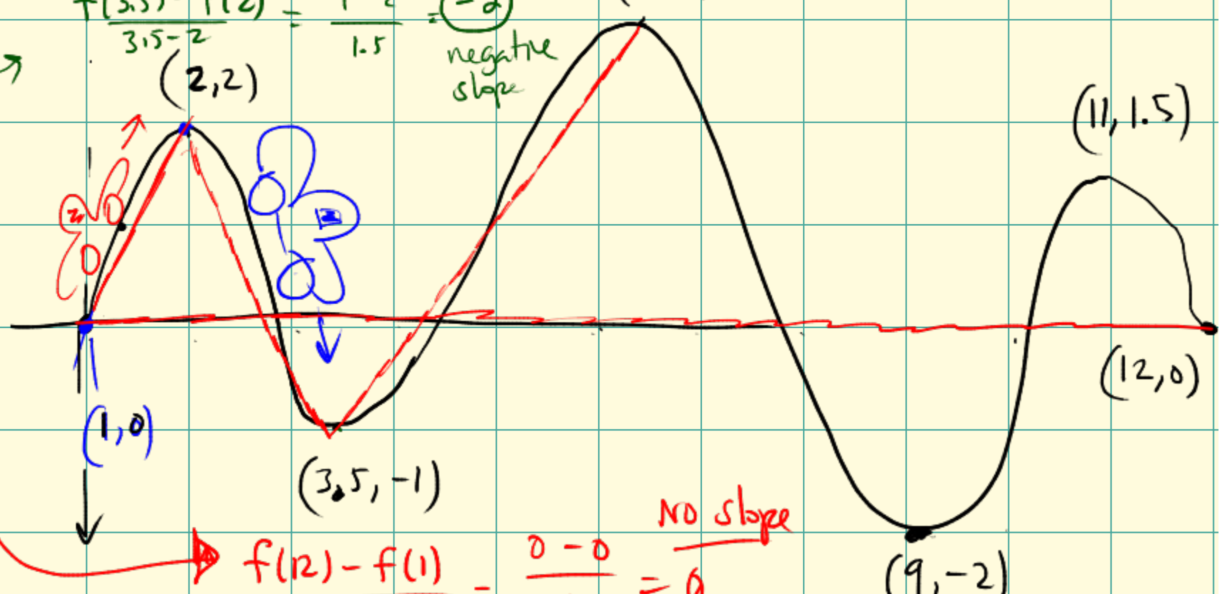
$(1,2)$ → $\dfrac{f(2)-f(1)}{2-1} = \dfrac{2-0}{2-1} = 2$ positive slope

$(2,3.5)$ → $\dfrac{f(3.5)-f(2)}{3.5-2} = \dfrac{-1-2}{1.5} = -2$ negative slope

$(1,6.5)$

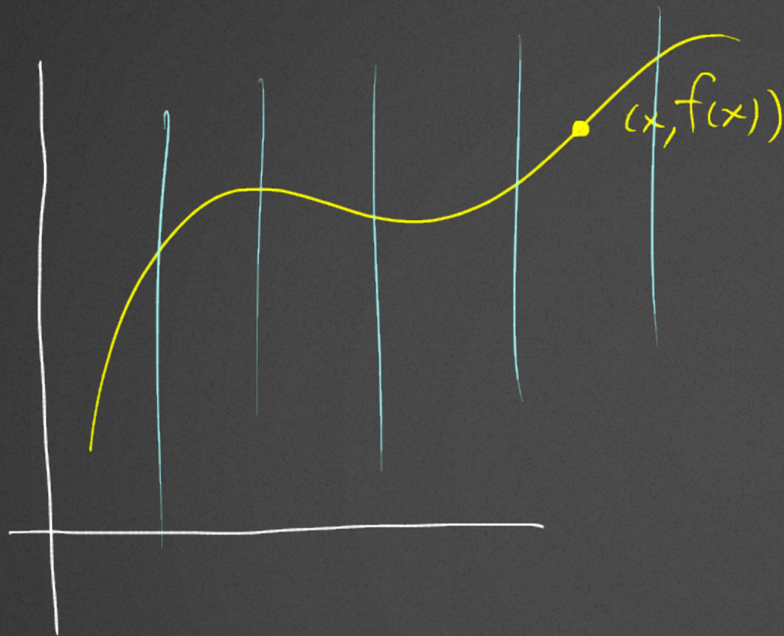
$(1,12)$ → $\dfrac{f(12)-f(1)}{12-1} = \dfrac{0-0}{11} = 0$ No slope

intervals of x-values (a,b)



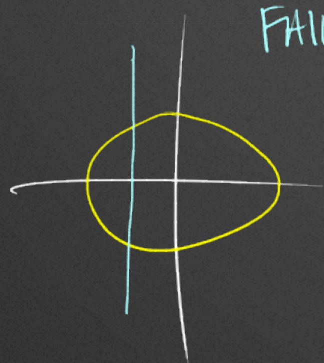
Average Rate of Change: of a function $f(x)$ on (a,b) is $\boxed{\dfrac{f(b)-f(a)}{b-a}}$

(Average slope)



Any vertical line intersects the graph just once

Ex



FAILS the Vertical Line Test

$\Rightarrow$ The circle is not the graph of a function.

Average Rate of Change: (an average slope)
of a function on an interval (a, b) is $\dfrac{f(b)-f(a)}{b-a}$

A.R.o.C of $f(x)$ on $(0,12)$ is

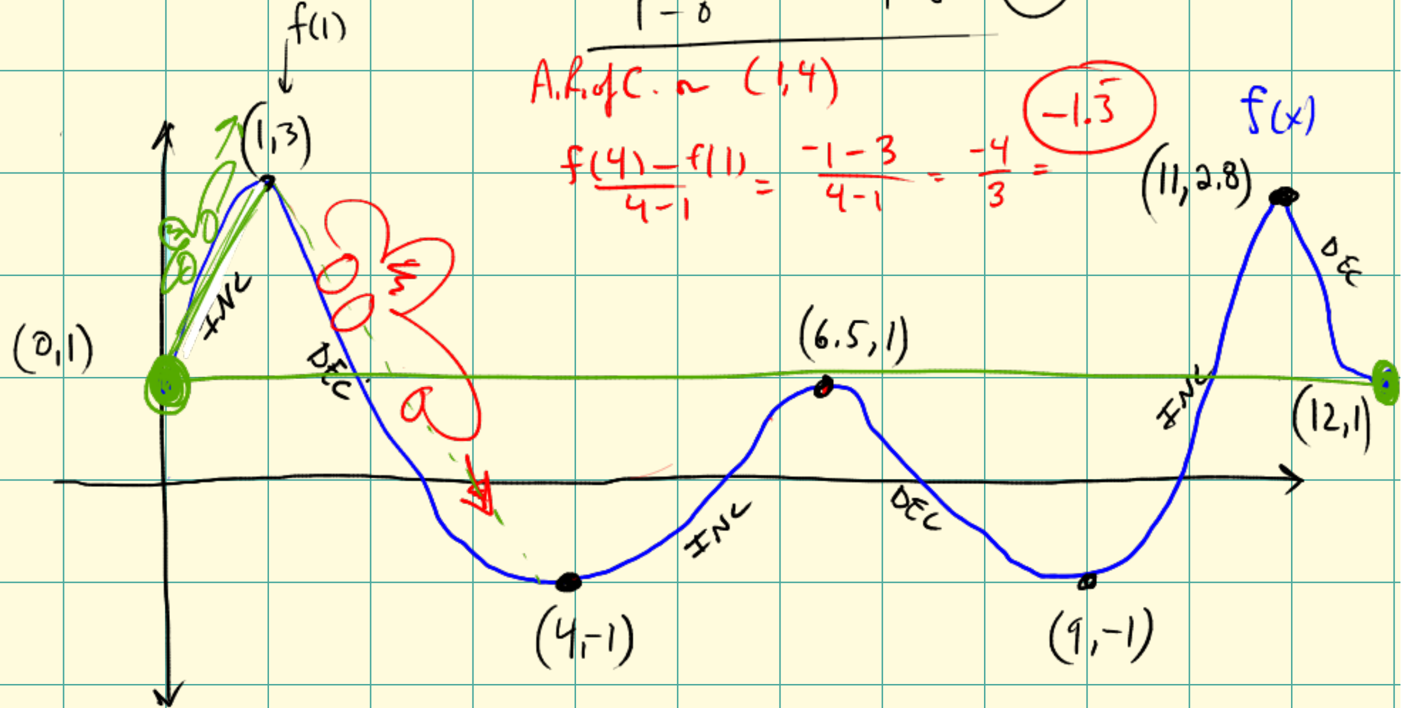
$$\frac{f(12)-f(0)}{12-0} = \frac{1-1}{12-0} = \frac{0}{12} = 0$$

A.R.of.C of $f(x)$ on $(0,1)$

$$\frac{f(1)-f(0)}{1-0} = \frac{3-1}{1-0} = 2$$

A.R.of.C. on $(1,4)$

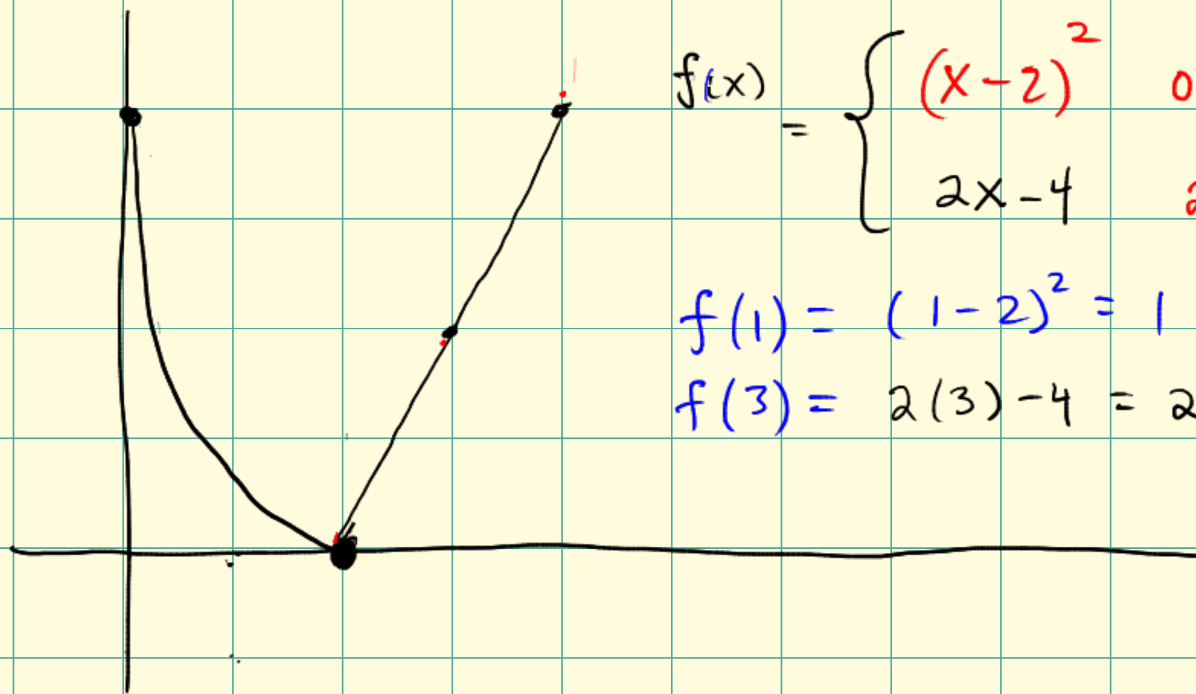
$$\frac{f(4)-f(1)}{4-1} = \frac{-1-3}{4-1} = \frac{-4}{3} = -1.\overline{3}$$



INCREASING:
whenever $a < b$
$f(a) < f(b)$

DECREASING
whenever $a < b$
$f(a) > f(b)$

Piecewise Function



$$f(x) = \begin{cases} (x-2)^2 & 0 \le x \le 2 \\ 2x-4 & 2 \le x \end{cases}$$

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

$f(3) = 2(3)-4 = 2$

Example: An online retailer provides free shipping on orders of \$75 or more. The cost of purchasing x items at a cost of \$20 per item is

$$C(x) = \begin{cases} 20x + \text{shipping} & x < 4 \\ 20x & x \ge 4 \end{cases}$$

Function Composition.

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

$g(x) = \frac{1}{x}$

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

$f \circ g(x)$ means f composed with g

$f \circ g(x) = f(g(x))$ plug $g(x)$ into $f(x)$.

So $f \circ g(x) = f(g(x)) = f\left(\frac{1}{x}\right) = \left(\frac{1}{x}\right)^2 + 1$

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

$h(f(x)) = \frac{(x^2+1)-1}{(x^2+1)+1} = \frac{x^2}{x^2+2}.$

$g(g(x)) = \frac{1}{g(x)} = \frac{1}{\left(\frac{1}{x}\right)} = x$

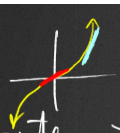
$g \circ g \circ g(x) = g(g(g(x))) = g\left(g\left(\frac{1}{x}\right)\right)$

$= g(x) = \frac{1}{x}$

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

$= x^4 + 2x^2 + 2$

Practice:



$$\frac{f(b)-f(a)}{b-a} = \frac{1^3-(-1)^3}{1-(-1)} = 1 \quad \Big| \quad \frac{f(4)-f(3)}{4-3} = \frac{64-27}{1} = 37 \quad \Big| \quad \frac{f(31)-f(30)}{31-30} = \frac{31^3-30^3}{1} = 2791$$

1. Compute the average rate of change of $f(x) = x^3$ on $\overset{(a,\,b)}{(-1,1)}$ & $(3,4)$ $(30,31)$

2. Is $f(x)$ increasing or decreasing on $(-1,1)$

3. Evaluate $f(1)$ & $f(10)$ if

$$f(x) = \begin{cases} x+1 & x<5 \\ x^2 & x \geq 5 \end{cases}$$

4. If $f(x) = 3x$, $g(x) = x+1$ compute

$f(g(x))$, $g(f(x))$ & $g(f(3))$ & $f(g(3))$.

2.4.2. $(6,5)$ $\boxed{3x + 4y = 3}$ $\longrightarrow$ $4y = -3x + 3$

line thru ↑ parallel to ↑ $\Rightarrow y = -\frac{3}{4}x + \frac{3}{4}$

our line has slope $m = -\frac{3}{4}$

now our line has form $y = -\frac{3}{4}x + b$

need to know b.

$(6,5)$ lives on line, so $5 = -\frac{3}{4}(6) + b$

x y

$(1,2)$ & $(3,4)$, line thru these pts in form

$$Ax + By + C = 0$$

$m = \frac{4-2}{3-1} = \frac{2}{2} = 1$, $y = x + b$ $\Rightarrow$ $y = x + 1$

$4 = 3 + b$ $\quad -x \; -1$

$1 = b$

or

$(-1)(-x + y - 1) = (0)(-1)$

$x - y + 1 = 0$

make sure $A > 0$

Name:
Exam 2 :: Math 111 :: October 7, 2015

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1. A car rental company offers two plans for renting a car.

   Plan A: 30 dollars ~~per day~~ and 17 cents per mile.
   Plan B: 50 dollars per day with unlimited mileage.

   For what range of miles will plan B save you money?

$$\boxed{50 < 30 + .17X}$$

$$20 < .17x$$

$$\underset{\text{miles}}{117} = \frac{20}{.17} < X$$

$$\Rightarrow \quad X \geq 117 \text{ miles}$$

2. If the circumference of a circle is 10 inches more than its diameter, then what is its area?

$$C = 10 + d = \boxed{10 + 2r = 2\pi r} \; \star$$

$$10 = 2\pi r - 2r = r(2\pi - 2)$$

$$\frac{10}{2\pi - 2} = r$$

$$A = \pi r^2 = \boxed{\pi\left(\frac{10}{2\pi - 2}\right)^2} \approx 17 \text{ inches}$$

$xy=0$ | $x=0, y=1$
$x=0, y=2$
$x=143, y=0$

$xy=6$

$x=1, y=6$
$x=2, y=3$
$x=12, y=\frac{1}{2}$
$x=3, y=2$
$x=-2, y=-3$
$x=-6, y=-1$
$x=32, y=\frac{6}{32}$

3. Find all real solutions to:

(a)

$$x^2 - 8x - 48 = 0$$

$$(x-12)(x+4)=0$$

$x-12=0$ $\qquad$ $x+4=0$

$x=12$ $\qquad$ $x=-4$

(b)

$x^2 - 16x - 10 = 0$ (by completing the $\boxed{\text{square}}$)

$+10 \quad +10$

$$x^2-16x+64 = 10 + 64 = 74$$

$$\cancel{(x-8)(x-8)=74}$$

$$\cancel{x-8=74}$$

$$(x-8)^2 = 74$$

$$x-8 = \pm\sqrt{74} \qquad x = 8 \pm \sqrt{74}$$

(c)

$x^6 - 9x^3 + 18 = 0$ (find the exact solutions - no decimals)

$$(x^3-6)(x^3-3)=0$$

$x = \sqrt[3]{6}$ $\qquad$ $x^3=3$

$x=\sqrt[3]{3}$

applied quad. formula.

$x=6, y=3$

cube root

4. Find all real solutions to:

(a)

or quad formula

$$5x^4 - 4x^3 - 1x^2 = 0$$

$$x^2(\underbrace{5x^2 - 4x - 1}_{=0}) = 0$$

$x^2 = 0$

$x = 0$

$(5x+1)(x-1)$

$x = 1$, $x = -1/5$

(b)

WeBWorK

$$9\sqrt{x} - 5\sqrt{x} = \frac{2}{3}x$$

$$(4\sqrt{x})^2 = \left(\frac{2}{3}x\right)^2$$

$$16x = \frac{4}{9}x^2$$

$$0 = \frac{4}{9}x^2 - 16x \Rightarrow 0 = x^2 - 36x$$

$0 = x(x-36)$

$x = 0$

$x - 36 = 0$

$x = 36$

(c)

$(x-2)(x+2) = (x^2-4)$

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

Because this is an equation (NOT INEQUALITY) you can (clear denominators)

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

$$x+2-2x+4-3=0$$

$$-x+3=0 \Rightarrow x=3$$

$$\frac{x}{x-6} - \frac{x}{1}\left(\frac{x-6}{x-6}\right) = \frac{x - x^2 + 6}{x-6} = \boxed{\frac{-x^2 + 7x}{x-6} \geq 0}$$

5. Solve each inequality

(a)

$$\frac{x}{x-6} \geq \frac{x}{1}$$

C.P.'s

$-x^2 + 7x = 0$

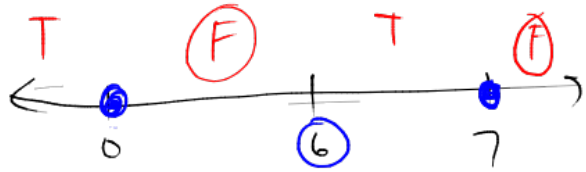
$x(-x+7) = 0$

$x = 0$

$x = 7$

$x - 6 = 0$

$x = 6$



$$\frac{-(6.5)^2 + 7(6.5)}{.5} \geq 0$$

$$\boxed{(-\infty, 0] \cup (6, 7]}$$

(b) $|2x - 1| > 15$

$\Downarrow$

$2x - 1 > 15$ or $2x - 1 < -15$

$2x > 16$ $\quad$ $2x < -14$

$x > 8$ or $x < -7$

(c) $5x - 12 \leq 17x + 1$

$-5x$

$-13 < 12x$

$\frac{-13}{12} < x$

6. I tell my friends that this class ____.