Written assignments to hand in.

Section 2.6

46, 50

Due Wednesday 10/25

Section 2.7

16, 56

Due Friday 10/26

Section 2.8

40, 56

Due Monday 10/30

Discussion Problems

From the department syllabus

These are not to hand in.

Sections 2.7, 2.8

WebAssign

Sections 2.5 + 2.6

Due Wednesday 10/25 9pm

Sections 2.7 + 2.8

Due Monday 10/30, 9pm

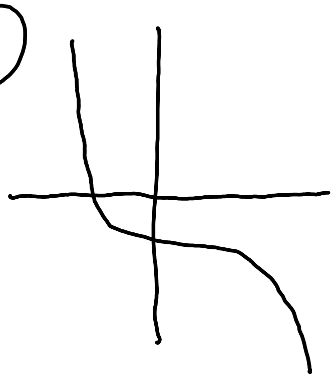
Exam 2 will be covering

1.6-1.8, 2.1-2.8

Tuesday 10/31

Section 2.8

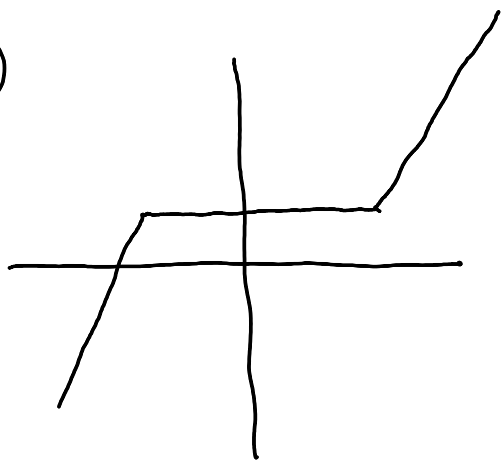
(8)



one-to-one or not?

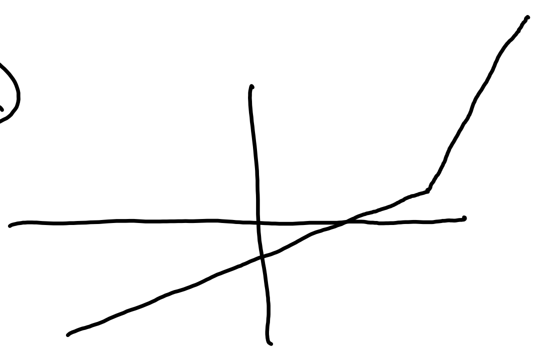
yes, one-to-one.

(10)



no, not one-to-one

(12)



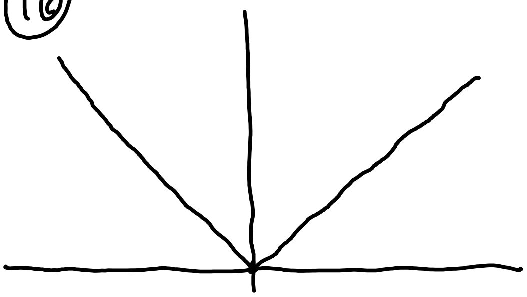
yes, one-to-one

(14) $f(x) = 3x - 2$

linear function with non-zero slope

yes, all such linear functions are one-to-one

(16)



$y = |x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$

no, not one-to-one.

For example $|-2| = |2|$ but $-2 \neq 2$

(25) Let f one-to-one function.

(a) If $f(2) = 7$, Then what is $f^{-1}(7)$?

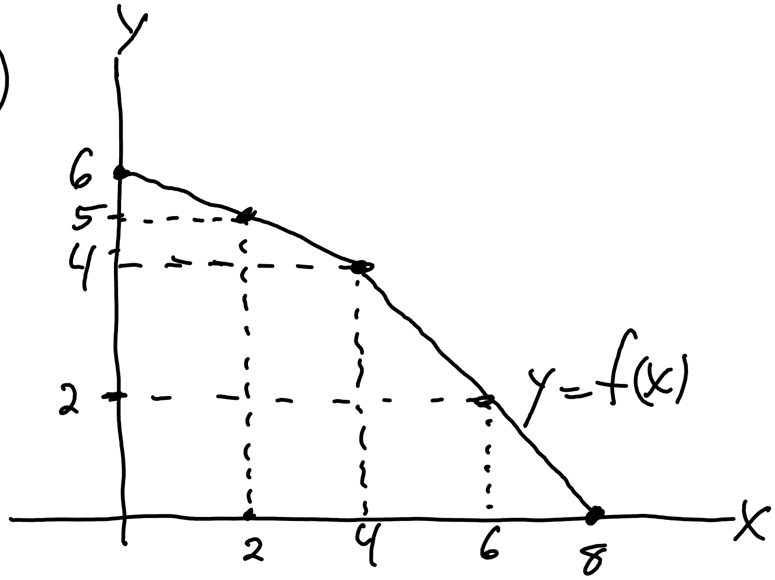
$f^{-1}(7) = 2$

(b) If $f^{-1}(3) = -1$, Then what is $f(-1)$?

$f(-1) = 3$.

Side note If $f(2) = 7$ and $f(-3) = 7$ Then what is $f^{-1}(7)$? $f^{-1}(7)$ is not well defined, so this is why $f^{-1}(x)$ doesn't exist for $f(x)$ not one-to-one.

(29)



(a) $f^{-1}(2)=6$ because $f(6)=2$

(b) $f^{-1}(5)=2$

(c) $f^{-1}(6)=0$

(39) $f(x)=3x+4$, $g(x)=\frac{x-4}{3}$

Are f(x) and g(x) inverse functions?

The answer is yes if and only if

$$(f\circ g)(x) = (g\circ f) = x$$

$$(f\circ g)(x) = f(g(x)) = f\left(\frac{x-4}{3}\right) = \cancel{3}\left(\frac{x-4}{\cancel{3}}\right)+4 = x-4+4 = x$$

$$(g\circ f)(x) = g(f(x)) = g(3x+4) = \frac{(3x+4)-4}{3} = \frac{3x}{3} = x \checkmark$$

yes f(x) and g(x) are inverses of each other.

Here is a nice example of a linear functions

which are inverses of each other.

The relationship between celsius c and Farenheit f is linear.

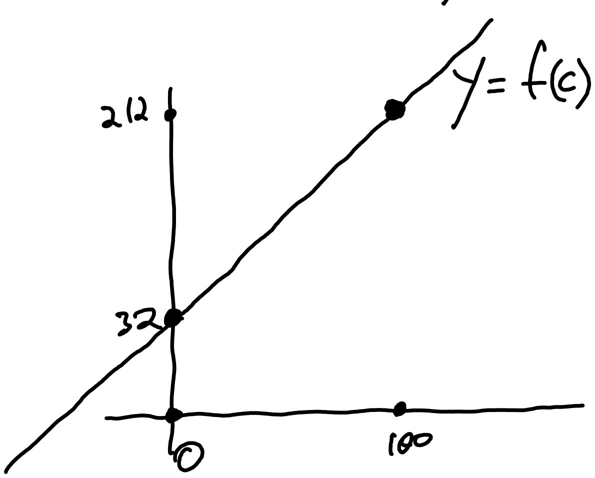
We know that 32 f is 0 c

and 212 f is 100 c

So if we put f on the y-axis and c on the x-axis

Then (0, 32) and (100, 212) are two points on

the line y = f(c) changing celsius to Farenheit.



$$\text{Slope} = \frac{212-32}{100-0} = \frac{180}{100} = \frac{9}{5}$$

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

input = degrees celsius
output = degrees farenheit.

The inverse function $c(f)$ converts Farenheit to Celsius

$$f = \frac{9}{5}C + 32 \quad \text{solve for } c$$

$$f - 32 = \frac{9}{5}c$$

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

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

(51) $f(x) = 5 - 4x^3$ find $f^{-1}(x)$.

$$y = 5 - 4x^3$$

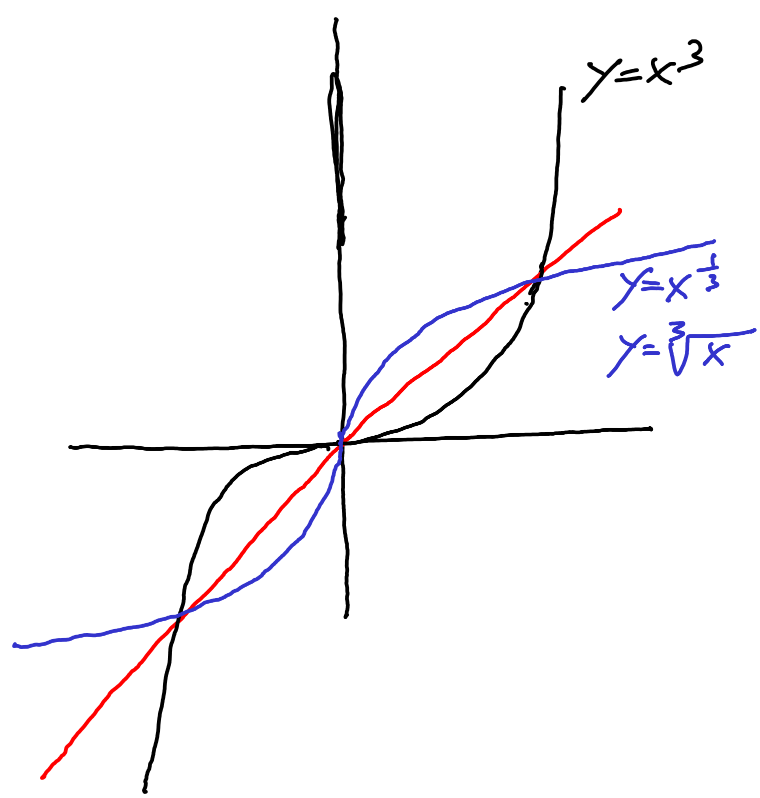
$$x = 5 - 4y^3 \quad \text{solve for } y$$

$$x - 5 = -4y^3$$

$$\frac{x-5}{-4} = y^3$$

$$\left(\frac{x-5}{-4}\right)^{\frac{1}{3}} = y$$

$$\boxed{f^{-1}(x) = \left(\frac{x-5}{-4}\right)^{\frac{1}{3}}}$$



58 $f(x)=\frac{4x-2}{3x+1}$ find $f^{-1}(x)$

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

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

$$(3y+1)x=\frac{4y-2}{\cancel{3y+1}}\cancel{(3y+1)}$$

$$3xy+x=4y-2$$
$$-4y-x \quad -4y-x$$

$$3xy-4y=-x-2$$

$$(3x-4)y=-x-2$$

$$y=\frac{-x-2}{3x-4}$$

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

(93) \$16 base price + \$1.50 each topping.

(a) So $p(n)$ = price of a pizza with n toppings.

$p(n) = mn + b$ dollars

m = slope = rate of change $\frac{\$}{\text{topping}}$

$= 1.50$

b = y-intercept

= initial condition $p(0) = 16$

$$\boxed{p(n) = 1.50n + 16}$$

(b) find The inverse function.

$p = 1.50n + 16$ solve for n.

$p - 16 = 1.50n$

$\frac{p-16}{1.50} = n$

$n(p) = \frac{p-16}{\frac{3}{2}}$

$$\boxed{n(p) = \tfrac{2}{3}(p-16) \text{ toppings}}$$

The inverse function represents The number of toppings which gives a pizza a final cost of p dollars.

Ⓒ If $p = 25\$$ how many toppings does it have?

Solution 1

$$n(25) = \frac{2}{3}(25-16)$$

$$= \frac{2}{3} 9 = 6 \text{ toppings}$$

Solution 2

$$p = 1.50n + 16$$

$$25 = 1.50n + 16$$

$$\frac{9}{1.50} = \frac{1.50n}{1.50}$$

$$\boxed{6 = n \text{ toppings}}$$