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Assignment #1

1a) $f(x) = 2x - 3$

$$2a - 3 = 2b - 3$$

$$2a = 2b$$

$$a = b$$

Yes

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

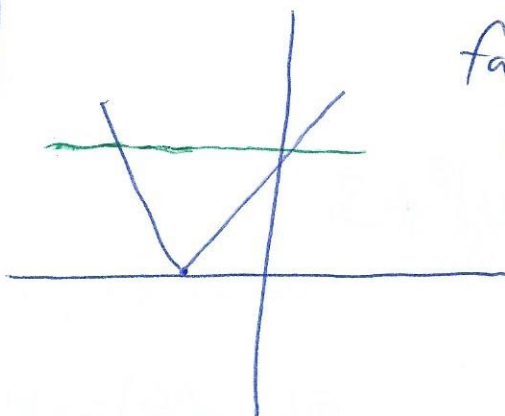
$$a^2 + 3 = b^2 + 3$$

$$a^2 = b^2, \sqrt{a^2} = \sqrt{b^2}$$

~~Yes~~ $a = \pm b$

No

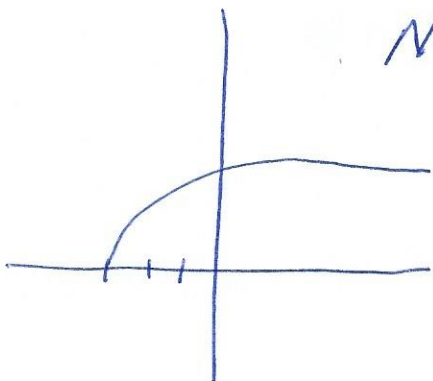
1c) $f(x) = |x + 1|$



fails the horizontal
line test,

No

1e) $f(x) = \sqrt{x + 3}$



No, does not pass
the horizontal
line test

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$$2f) f(x) = \sqrt[3]{x-3} + 4$$

$$y = \sqrt[3]{x-3} + 4$$

$$x = \sqrt[3]{y-3} + 4, \text{ switch } x \text{ and } y$$

$$x-4 = \sqrt[3]{y-3}$$

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

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

$$\text{Answer: } f^{-1}(x) = (x-4)^3 + 3$$

$$2d) f(x) = \sqrt[3]{x} - 8$$

$$y = \sqrt[3]{x} - 8$$

$$x = \sqrt[3]{y} - 8$$

$$\sqrt[3]{y} = x + 8$$

$$y = (x+8)^3$$

$$f^{-1}(x) = (x+8)^3$$

$$2b) f(x) = -x$$

$$y = -x$$

$$x = -y$$



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$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

A = amount

P = principle

r = rate (return on principle during unit of time)

n = number (of compounds per year)

t = time (typically in years)

What does $\left(1 + \frac{1}{n}\right)^n$ approach as n approaches infinity?

Interest Formula: $A = Pe^{rt}$
(continuous compound)

$y = \log_b(x)$ if and only if $b^y = x$
b is called the base of this logarithm

$\log_{10}(x) = \log(x) \rightarrow$ "common" logarithm

$\log_e(x) = \ln(x) \rightarrow$ "natural" logarithm

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Ex: $\log(1000)$

Ask: 10 to the what power is 1000?

$$\text{So, } \log(1000) = \log(10^3) = 3$$

Another way: $\log_{10}(1000) = y$

$$\text{So, } 10^y = 1000$$

Logarithm Rules

$$1. \log_b(xy) = \log_b(x) + \log_b(y)$$

$$2. \log_b(x^y) = y \log_b(x)$$

$$3. \log_b(x/y) = \log_b(xy^{-1}) = \log_b(x) - \log_b(y)$$

$$\text{Ex: } \log_2(x) + \log_2(x+1) = 4$$

$$\text{Answer: } \log_2(x(x+1)) = 4$$

$$2^4 = x(x+1) = x^2 + x$$

$$x^2 + x - 16 = 0$$

Use the quadratic formula

