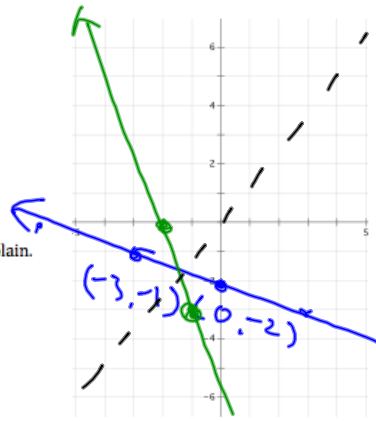
ALG III 2/27/18
Quiz Review

Name:_____

1. Given $f(x)=-\frac{1}{3}(x+6)$

a. Graph f(x) (-3, -1) (0, -2)



$y-0=-\frac{1}{3}(x+6)$

(-6, 0)

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

b. Will the inverse of f(x) be a function? Explain.

c. Graph $f^{-1}(x)$ on the same coordinate plane in a different color.

d. Using the graph, find the equation of $f^{-1}(x)$ (-1, -3) (-2, 0)

$f(x)=-\frac{1}{3}(x+6)$

$y=-\frac{1}{3}(x+6)$

$x=-\frac{1}{3}(y+6)$

$-3x=y+6$

$-3x-6=y$

$f^{-1}(x)=-3x-6$

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

$f(f^{-1}(x)) = -\frac{1}{3}(-3x - 6 + 6)$

$= -\frac{1}{3}(-3x)$

$= x$

$f^{-1}(f(x)) = -3\left(-\frac{1}{3}(x+6)\right) - 6$

$= x + 6 - 6$

$= x$

2. Verify that $f^{-1}(x) = (x-4)^2 + 2$ and $f(x) = \sqrt{x-2} + 4$ are inverses of each other.

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

$\left(\sqrt{x-2}\right)^2 + 2$

$x - 2 + 2$

x

$f(f^{-1}(x))$

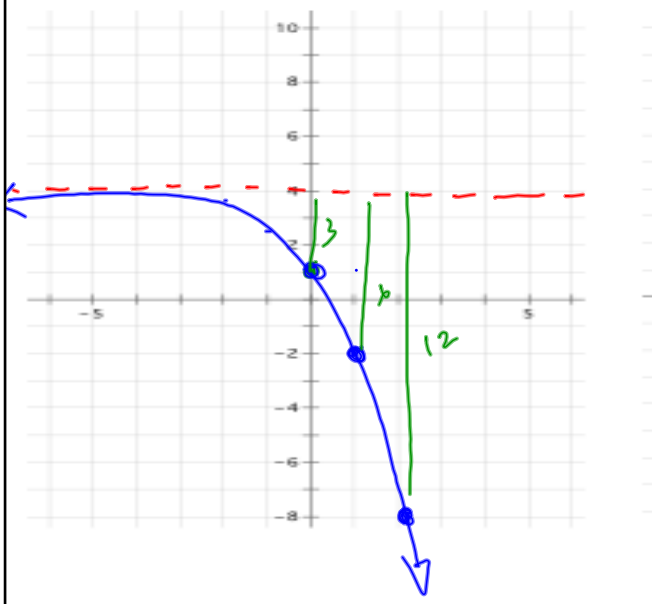
$\sqrt{(x-4)^2 + 2} - 2 + 4$

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

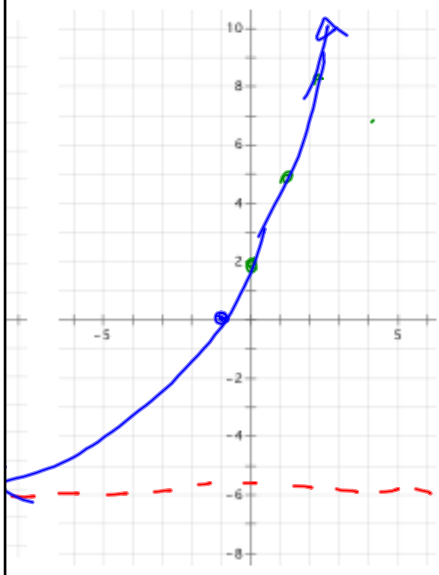
$x - 4 + 4$

x

a. $f(x) = -3(2)^x + 4$



c. $f(x) = 8\left(\frac{3}{4}\right)^{-x} - 6$



$f(x) = 8\left(\frac{4}{3}\right)^{x} - 6$

c. $4^x = \frac{1}{64}$

$4^x = 4^{-3}$

$x = -3$

d. $10^{3x-7} = 1000^{2x+2}$

$10^{3x-7} = (10^3)^{2x+2}$

$10^{3x-7} = 10^{3(2x+2)}$

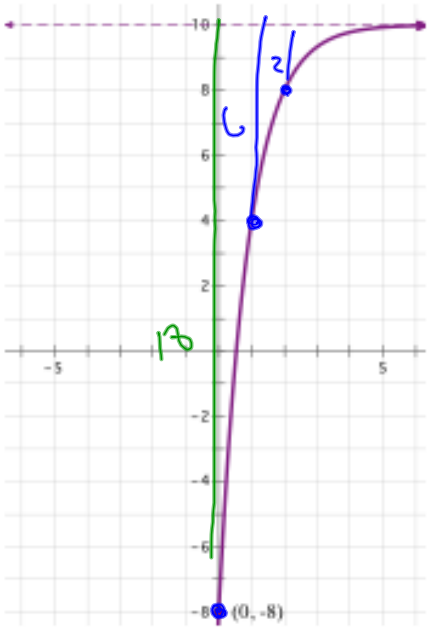
$3x-7 = 3(2x+2)$

$3x-7 = 6x+6$

$-13 = 3x$

$\frac{-13}{3} = x$

4. Write an equation for each graph.



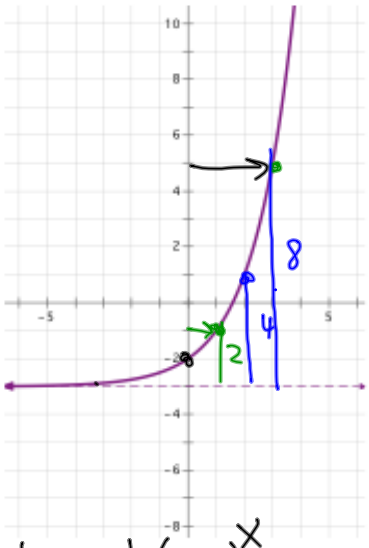
$y = 18\left(\frac{1}{3}\right)^x + 10$

$18 \cdot b = 6$

$b = \frac{6}{18} = \frac{1}{3}$

$6 \cdot b = 2$

$b = \frac{2}{6} = \frac{1}{3}$



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

$y = 8\left(2\right)^{x-3} - 3$

$y = 1\left(2\right)^x - 3$

2. Given $f(x)=\frac{10x+9}{4}$ and $g(x)=\frac{2x-9}{5}$,

a. Use composition to show that these functions are NOT inverses of each other.

$$f(f^{-1}(x)) = \frac{10\left(\frac{2x-9}{5}\right)+9}{4}$$

$$\frac{4x-18+9}{4}$$

$$\frac{4x-9}{4} \neq x$$

Not inverse

b. Algebraically determine $f^{-1}(x)$.

$$y=\frac{10x+9}{4}$$

$$x=\frac{10y+9}{4}$$

$$4x=10y+9$$

$$4x-9=10y$$

$$\frac{4x-9}{10}=y$$

$$f^{-1}(x)=\frac{4x-9}{10}$$

2. Verify that $f^{-1}(x)=(x-4)^2+2$ and $f(x)=\sqrt{x-2}+4$ are inverses of each other.

$f(f^{-1}(x)) = x$

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

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

$x-4+4$

x

$f^{-1}(f(x)) = x$

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

$(\sqrt{x-2})^2+2$

$x-2+2$

x

en $f(x)=\dfrac{10x+9}{4}$

$y=\dfrac{10x+9}{4}$

$x=\dfrac{10y+9}{4}$

$4x=10y+9$

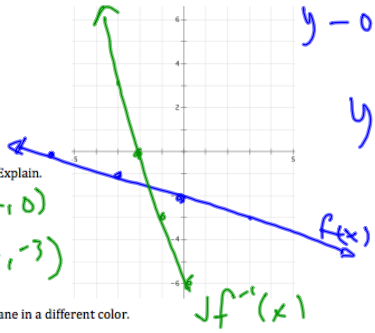
$4x-9=10y$

$\dfrac{4x-9}{10}=y$

$f^{-1}(x)=\dfrac{4x-9}{10}$

1. Given $f(x)=-\frac{1}{3}(x+6)$

a. Graph f(x)



$y-0=-\frac{1}{3}(x+6)$

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

b. Will the inverse of f(x) be a function? Explain.

(0, -2) (-2, 0)

(-3, -1) (-1, -3)

c. Graph $f^{-1}(x)$ on the same coordinate plane in a different color.

$f^{-1}(x)$

d. Using the graph, find the equation of $f^{-1}(x)$

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

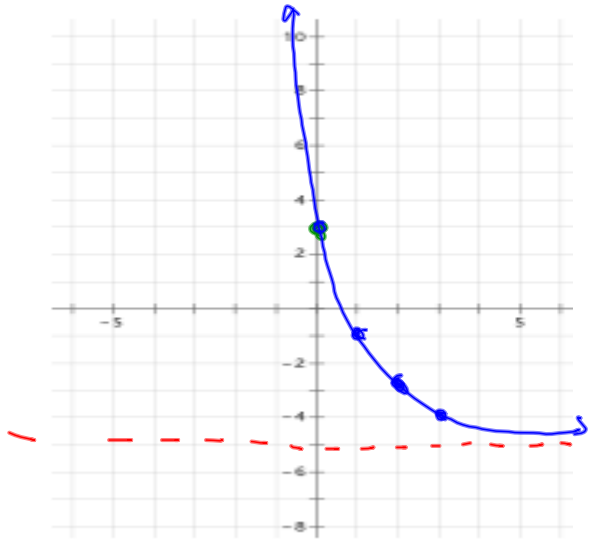
$x+2=-\frac{1}{3}y$

$-3(x+2)=y$

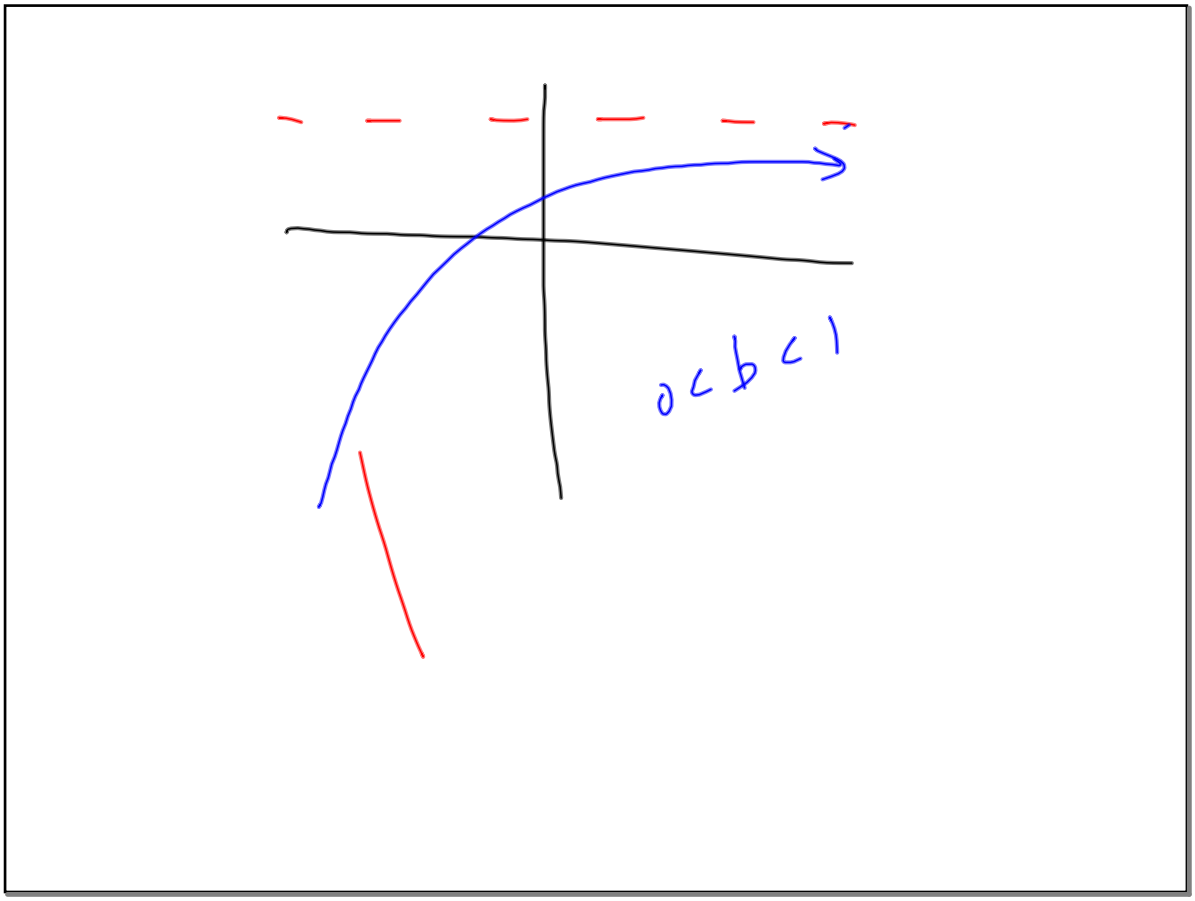
$-3x-6=y$

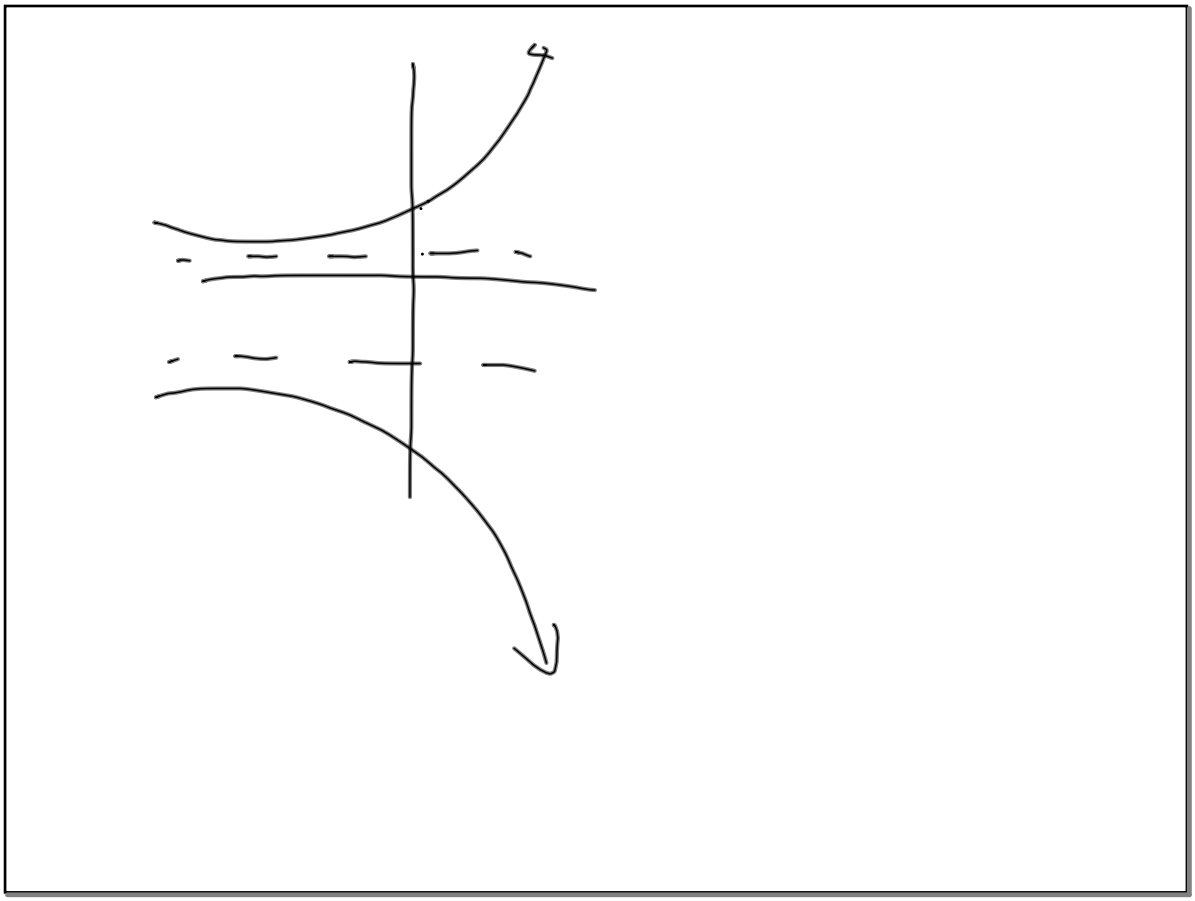
$f^{-1}(x)=-3x-6$

b. $f(x)=8\left(\frac{1}{2}\right)^x-5$

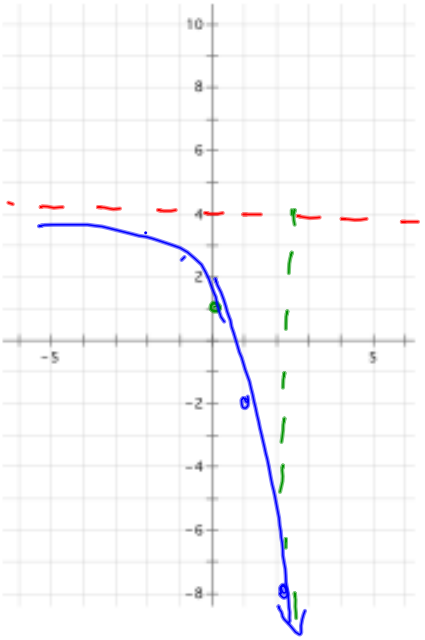


$0<b<1$


0 < b < 1



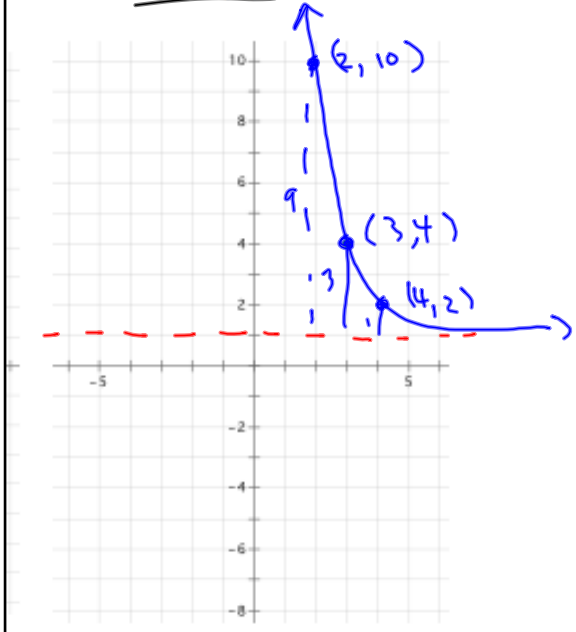
a. $f(x) = -3(2)^x + 4$



$y = -12(2)^{x-2} + 4$

$y = -6(2)^{x-1} + 4$

c. ~~$f(x) = -3(2)^x + 4$~~ $= 6$ =



$y = 9\left(\frac{1}{3}\right)^{x-2} + 1$

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

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

b. $\left(\frac{1}{27}\right)^{x-1} = 9^{2x}$

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

$$3^{-3(x-1)} = 3^{2(2x)}$$

$$-3x + 3 = 4x$$

$$3 = 7x$$

$$\frac{3}{7} = x$$