Today's Plan:

Learning Target (standard): I will find the inverse of a function and verify that it is indeed the inverse function. I will graph exponential functions.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

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4) Beth - Bob

Diane - Dave

Marcia - John & Chuck

*not a function

8a) {(2,1),(8,2),(18,3),(32,4)}

b) Inverse is a function

12) NOT 1-1

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

36) $f^{-1}(x) = \sqrt[3]{x-1}$

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

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

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

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

Verify that the given functions are inverses of one another:

$$f(x)=\frac{2x+3}{x+4}$$

$$g(x)=\frac{4x-3}{2-x}$$

$$f(g(x))=\frac{2\left(\frac{4x-3}{2-x}\right)+3}{\frac{4x-3}{2-x}+4}=\frac{\frac{8x-6}{2-x}+\frac{6-3x}{2-x}}{\frac{4x-3}{2-x}+\frac{8-4x}{2-x}}$$

$$=\frac{\frac{5x}{2-x}}{\frac{5}{2-x}}=\frac{\cancel{5}x}{\cancel{2-x}}\cdot\frac{\cancel{2-x}}{\cancel{5}}=x\checkmark$$

$$g(f(x))=\frac{4\left(\frac{2x+3}{x+4}\right)-3}{2-\left(\frac{2x+3}{x+4}\right)}=\frac{\frac{8x+12}{x+4}+\frac{-3x-12}{x+4}}{\frac{2x+8}{x+4}+\frac{-2x-3}{x+4}}=\frac{\frac{5x}{x+4}}{\frac{5}{x+4}}$$

$$=\frac{\cancel{5}x}{\cancel{x+4}}\cdot\frac{\cancel{x+4}}{\cancel{5}}=x\checkmark$$

$\therefore f(x)$ & $g(x)$ are inverses because $f(g(x))=x$ and $g(f(x))=x$.

Find the inverse function. Verify your answer. Find the domain and range of each.

1-1 ✓ $f(x)=\frac{-3x-4}{x+5}$

$D_{f(x)}: \{x \mid x\neq -5\}$

$R_{f(x)}: \{y \mid y\neq -3\}$

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

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

$xy+5x=-3y-4$

$xy+3y=-5x-4$

$y(x+3)=-5x-4$

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

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

$D_{f^{-1}(x)}: \{x \mid x\neq -3\}$

$R_{f^{-1}(x)}: \{y \mid y\neq -5\}$

$$f(f^{-1}(x))=\frac{-3\left(\frac{-5x-4}{x+3}\right)-4}{\frac{-5x-4}{x+3}+5}=\frac{\frac{15x+12}{x+3}+\frac{-4x-12}{x+3}}{\frac{-5x-4}{x+3}+\frac{5x+15}{x+3}}$$

$$=\frac{\frac{11x}{x+3}}{\frac{11}{x+3}}=\frac{\cancel{11}x}{\cancel{x+3}}\cdot\frac{\cancel{x+3}}{\cancel{11}}=x\checkmark$$

$$f^{-1}(f(x))=\frac{-5\left(\frac{-3x-4}{x+5}\right)-4}{\frac{-3x-4}{x+5}+3}=\frac{\frac{15x+20}{x+5}+\frac{-4x-20}{x+5}}{\frac{-3x-4}{x+5}+\frac{3x+15}{x+5}}$$

$$=\frac{\frac{11x}{x+5}}{\frac{11}{x+5}}=\frac{\cancel{11}x}{\cancel{x+5}}\cdot\frac{\cancel{x+5}}{\cancel{11}}=x$$

$\therefore f(x)$ & $f^{-1}(x)$ are inverses because $f(f^{-1}(x))=x$ and $f^{-1}(f(x))=x$.

Exponential Functions:

parent function:

$$f(x) = a^x \quad (a > 1)$$

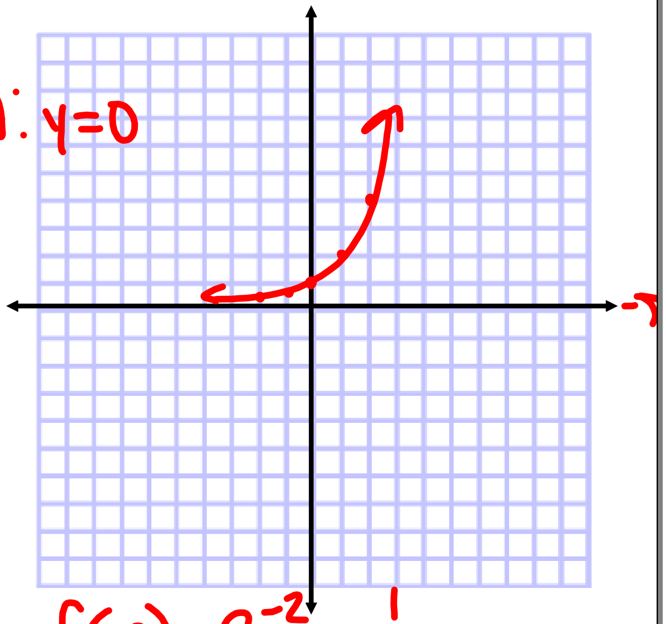
$$f(x) = 2^x$$

HA: $y=0$

x	y
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2
2	4

D: $\mathbb{R}$

R: $\{y \mid y>0\}$



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

Exponential Functions:

parent function:

$$f(x) = a^x \quad (a > 1)$$

$$f(x) = e^x$$

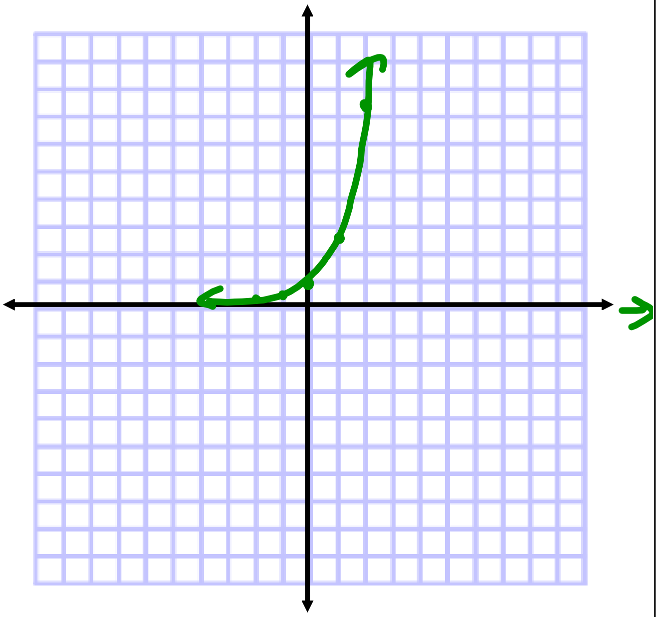
HA: $y=0$

"natural exponential function"

x	y
-2	.135
-1	.368
0	1
1	2.718
2	7.389

D: $\mathbb{R}$

R: $\{y \mid y>0\}$



* only parent function that will use decimals *

$e^1 \approx 2.718$

Exponential Functions:

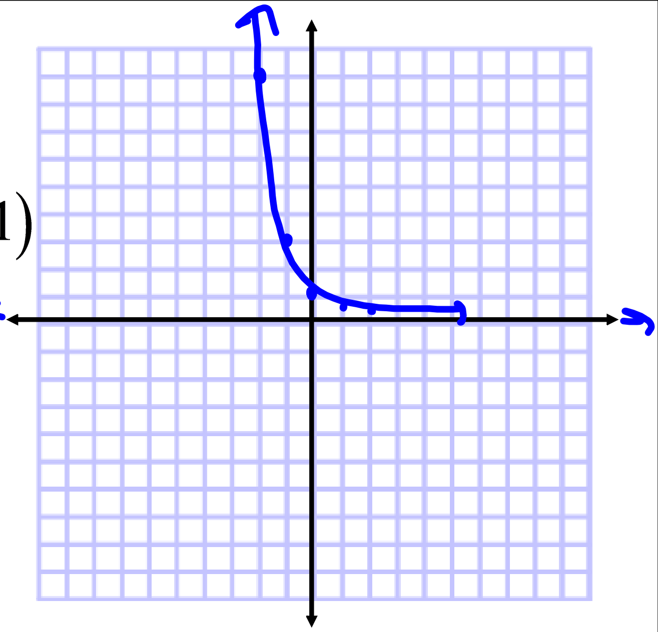
parent function:

$$f(x) = a^x \quad (0 < a < 1)$$

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

HA: $y = 0$

x	y
-2	9
-1	3
0	1
1	$\frac{1}{3}$
2	$\frac{1}{9}$



D: $\mathbb{R}$

R: $\{y \mid y > 0\}$

Assignment:

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