Today's Plan:

Learning Target (standard): I will graph exponential functions using transformations. I will graph logarithmic 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.

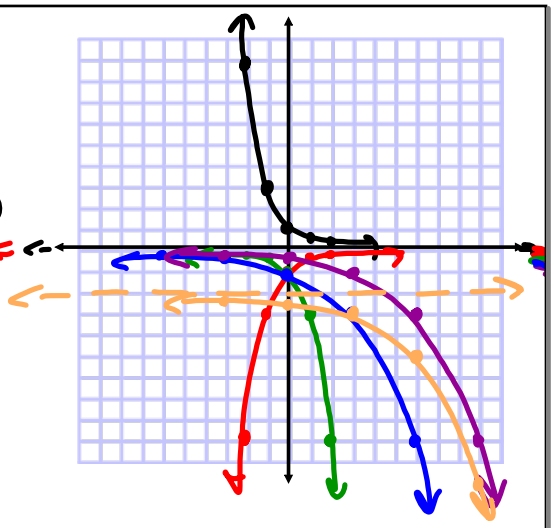
Assessment: Board work, homework check and homework assignment

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.

Go over your graphs with someone near you. Please do not hesitate to ask any questions you may have!

Graph. Find domain and range.

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



parent: $y=\left(\frac{1}{3}\right)^x$ HA: $y=0$

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

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

3) $y=-\left(\frac{1}{3}\right)^{-\frac{1}{3}x}$ h.s. by 3

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

5) $y=-\left(\frac{1}{3}\right)^{1-\frac{1}{3}x}-2$ shift down 2

HA: $y=-2$

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

D: $\mathbb{R}$

R: $\{y \mid y<-2\}$

Graph. Find domain and range.

$$f(x)=\begin{cases} e^{2x}, & x<0 \\ -2e^{x}, & x>0 \end{cases}$$

$f(x)=e^{2x}$

x	y
-2	.018
-1	.135
0	1

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

x	y
0	-2
1	-5.437
2	-14.778

HA: $y=0$

D: $\{x \mid x\neq 0\}$

R: $\{y \mid y<-2, 0<y<1\}$

① Find the inverse ② Verify your result. Graph the function and inverse on the same set of axes.

$f(x) = -\frac{3}{2}x - 5$

1-1 ✓

x	y
-2	-2
0	-5
2	-8

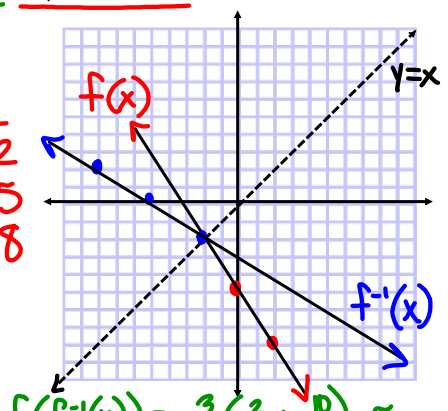
$y = -\frac{3}{2}x - 5$

$x = -\frac{3}{2}y - 5$

$x + 5 = -\frac{3}{2}y$

$-\frac{2}{3}x - \frac{10}{3} = y$

$f^{-1}(x) = -\frac{2}{3}x - \frac{10}{3}$



$f(f^{-1}(x)) = -\frac{3}{2}\left(-\frac{2}{3}x - \frac{10}{3}\right) - 5$

$= x + 5 - 5$

$f(f^{-1}(x)) = x$ ✓

$f^{-1}(f(x)) = -\frac{2}{3}\left(-\frac{3}{2}x - 5\right) - \frac{10}{3}$

$= x + \frac{10}{3} - \frac{10}{3}$

$f^{-1}(f(x)) = x$ ✓

$f^{-1}(x)$

x	y
-2	-2
-5	0
-8	2

① Graph the function and its inverse function. Find the domain and range of each.

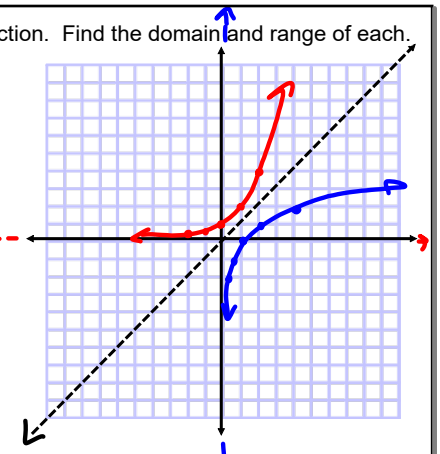
$f(x) = 2^x$

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

HA: $y = 0$

D: $\mathbb{R}$

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



$f^{-1}(x)$

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

VA: $x = 0$

D: $\{x \mid x > 0\}$ $(0, \infty)$

R: $\mathbb{R}$

$y = 2^x$ 1-1 ✓

$x = 2^y$

$y = \log_2 x$

Graph the function and its inverse function. Find the domain and range of each.

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

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

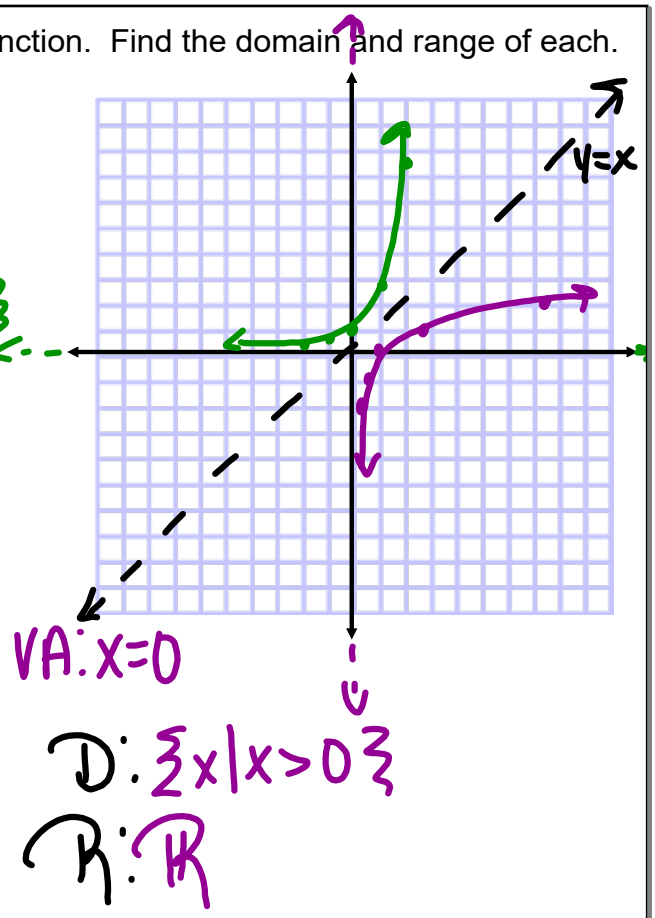
HA: $y=0$

D: $\mathbb{R}$

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

$f^{-1}(x)$

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



VA: $x=0$

D: $\{x \mid x>0\}$

R: $\mathbb{R}$

Assignment:

Inverses & Exponentials Worksheet

#1-7