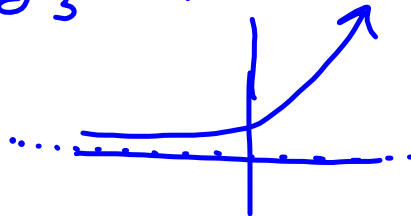


Homework Questions?

$$10) \log_3(-9) = x \Leftrightarrow 3^x = -9$$



Exponential is NOT
negative

Lesson 8.02:

Transformations of Logarithmic Functions



Learning Goals:

I can graph the various transformations of logarithmic functions

I can describe the transformations of logarithmic functions

I can create the transformed equation of a logarithmic function

For the function below

- > Graph the function.
- > State the transformations.
- > Determine where the points (1, 0) and (10, 1) map to.
- > State the domain and range.

$$f(x) = 3\log(x + 1) - 2$$

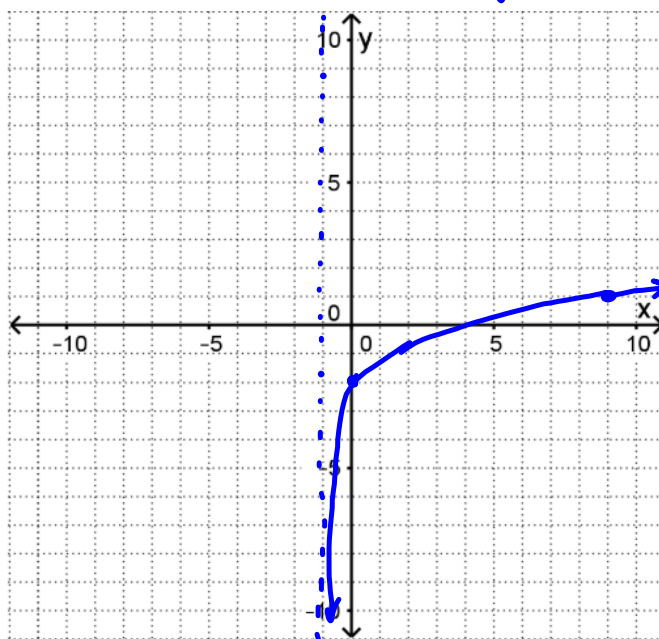
$$(x, y) = (x - 1, 3y - 2)$$

$$(1, 0) = (1 - 1, 3(0) - 2) \\ = (0, -2)$$

$$(10, 1) = (10 - 1, 3(1) - 2) \\ = (9, 1)$$

$$D: \{x \in \mathbb{R} \mid x > -1\}$$

$$R: \{y \in \mathbb{R}\}$$



For the function below

- > Graph the function.
- > State the transformations.
- > Determine where the points (1, 0) and (10, 1) map to.
- > State the domain and range.

$$f(x) = -\log(2(x + 5)) + 3$$

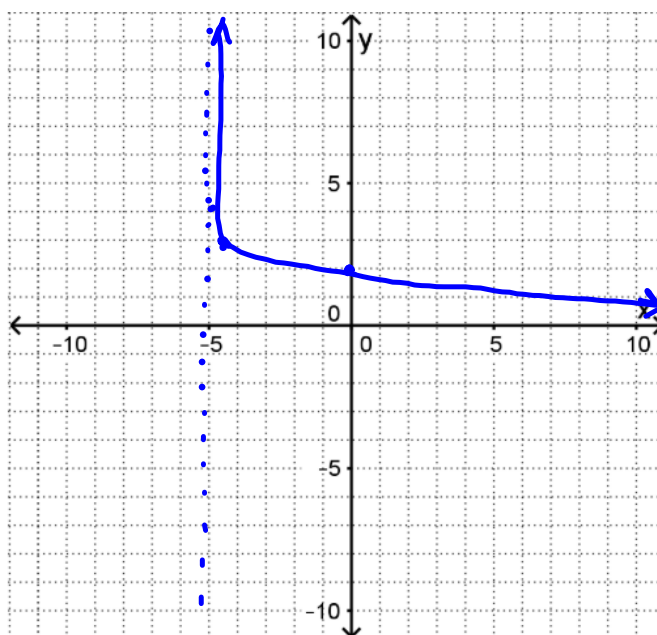
$$(x, y) \Rightarrow \left(\frac{x}{2} - 5, -y + 3\right)$$

$$(1, 0) \Rightarrow (-4.5, 3)$$

$$(10, 1) \Rightarrow (0, 2)$$

$$D: \{x \in \mathbb{R} \mid x > -5\}$$

$$R: \{y \in \mathbb{R}\}$$



In general:

$$f(x) = a \cdot \log(k(x - d)) + c$$

Diagram illustrating the components of the log function transformation:

- Vertical Stretch:** a
- Horizontal Stretch:** k
- Horizontal Translation:** d
- Vertical Translation:** c

I.E. - Same as every other graph!

Domain:

$$x > d \quad \text{if } k > 0$$

$$x < d \quad \text{if } k < 0$$

Range:

$$y \in \mathbb{R} \quad \text{ALWAYS!}$$


Homework:

pg 457-458 #1bc, 3b, 4ii, 4iv, 4vi,

5bde, 6, 7, 8¹, 9, 11¹the answer for 8a is incorrect¹the answer for 8b should be (25, -1)**UNIT 7 TEST TOMORROW!!**

Question:

$$\frac{1}{n} \sin x = ?$$

 *Bro solves*

Bro's solution:

$$\frac{1}{n} \sin x = ?$$
$$\frac{1}{\cancel{n}} \sin \cancel{x} =$$
$$six = 6$$