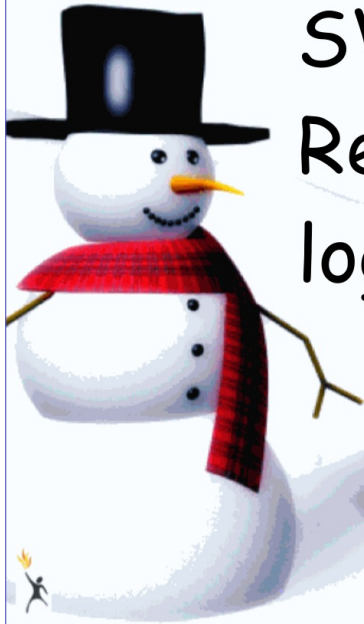


November 27



SWBAT:
Rewrite and simplify
log expressions



Essential Learning Goals:

- ☺ Use Properties of Exponents and Logarithms to transform expressions
- ☹ Solve exponential and log functions using inverse operations and simplification properties
- ☺ Graph rational functions, identifying zeros and asymptotes

Inverse functions

$$y = \sin(x) \rightarrow x = \sin^{-1}(y)$$

$$y = \cos(x) \rightarrow x = \cos^{-1}(y)$$

$$y = \tan(x) \rightarrow x = \tan^{-1}(y)$$

$$y = x^2 \rightarrow x = \sqrt{y}$$

$$y = 10^x \rightarrow x = \log_{10} y$$

$$y = e^x \rightarrow x = \ln(y) \leftarrow \begin{matrix} \text{natural} \\ \log \end{matrix} \log_e(y)$$

$$e = 2.718281828 \dots$$

Rewrite as an exponential equation

$$\log_4 x = y$$

$$\log_3 a = b$$

$$\log_5 125 = 3$$

$$\log_{32} 4 = \frac{2}{5}$$

$$\ln(1) = 0$$

(inverse)

$$4^y = x$$

$$3^b = a$$

$$5^3 = 125$$

$$32^{\frac{2}{5}} = 4$$

$$\sqrt[5]{32^2} = 4$$

$$\log_e(1) = 0$$

$$e^0 = 1$$

Rewrite as an exponential equation

$$\log_5 x = y$$

$$\log_3 a = b$$

$$\log_4 64 = 3$$

$$\log_{32} 4 = \frac{2}{5}$$

$$\ln(1) = 0$$

(inverse)

$$x = 5^y$$

$$a = 3^b$$

$$64 = 4^3$$

$$4 = 32^{\frac{2}{5}}$$

$$4 = \sqrt[5]{32^2}$$

$$\log_e(1) = 0$$

$$1 = e^0$$

Solve for y
(evaluate)

$$\ln(e^3) = y$$

$$\begin{aligned}\log_e(e^3) &= y \\ e^y &= e^3 \\ y &= 3\end{aligned}$$

$$\ln(e^5) = y$$

$$\begin{aligned}\log_e(e^5) &= y \\ e^y &= e^5 \\ y &= 5\end{aligned}$$

$$\log_2 16 = y$$

$$2^y = 16$$

$$2^y = 2^4 \leftarrow \begin{array}{l} \text{rewrite} \\ 16 \text{ using} \\ \text{a base of } 2 \end{array}$$

$$y = 4$$

Solve for y
(evaluate)

$$\ln(e^3) = y$$

$$\begin{aligned}\log_e e^3 &= y \\ e^3 &= e^y \\ 3 &= y\end{aligned}$$

$$\ln(e^5) = y$$

$$\begin{aligned}\log_e e^5 &= y \\ e^5 &= e^y \\ 5 &= y\end{aligned}$$

$$\log_2 16 = y$$

$$16 = 2^y$$

$$\begin{aligned}2^4 &= 2^y \\ 4 &= y\end{aligned} \leftarrow \begin{array}{l} \text{rewrite} \\ 16 \text{ with} \\ \text{a base} \\ \text{of } 2 \end{array}$$