Logarithmic Functions:

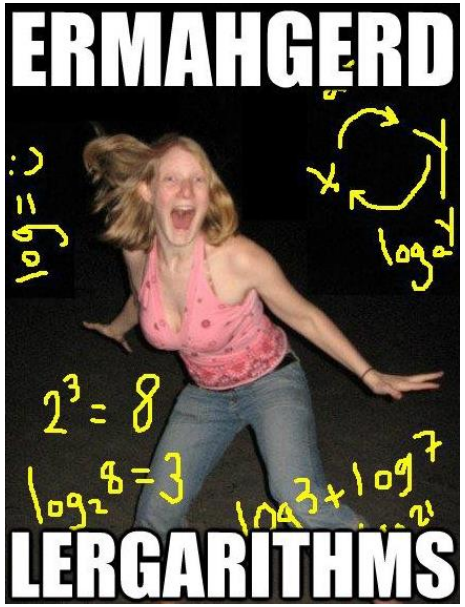
A function of the form $f(x) = log_b x$ with $b > 0$ and $b \neq 1$ is a called a logarithmic function with base *b*. It is the inverse of the exponential function b^x, so we can get the graph of a logarithmic function by reflecting the graph of the corresponding exponential function about the line $y = x$.

Just like the exponential functions, the bases separate into two categories:

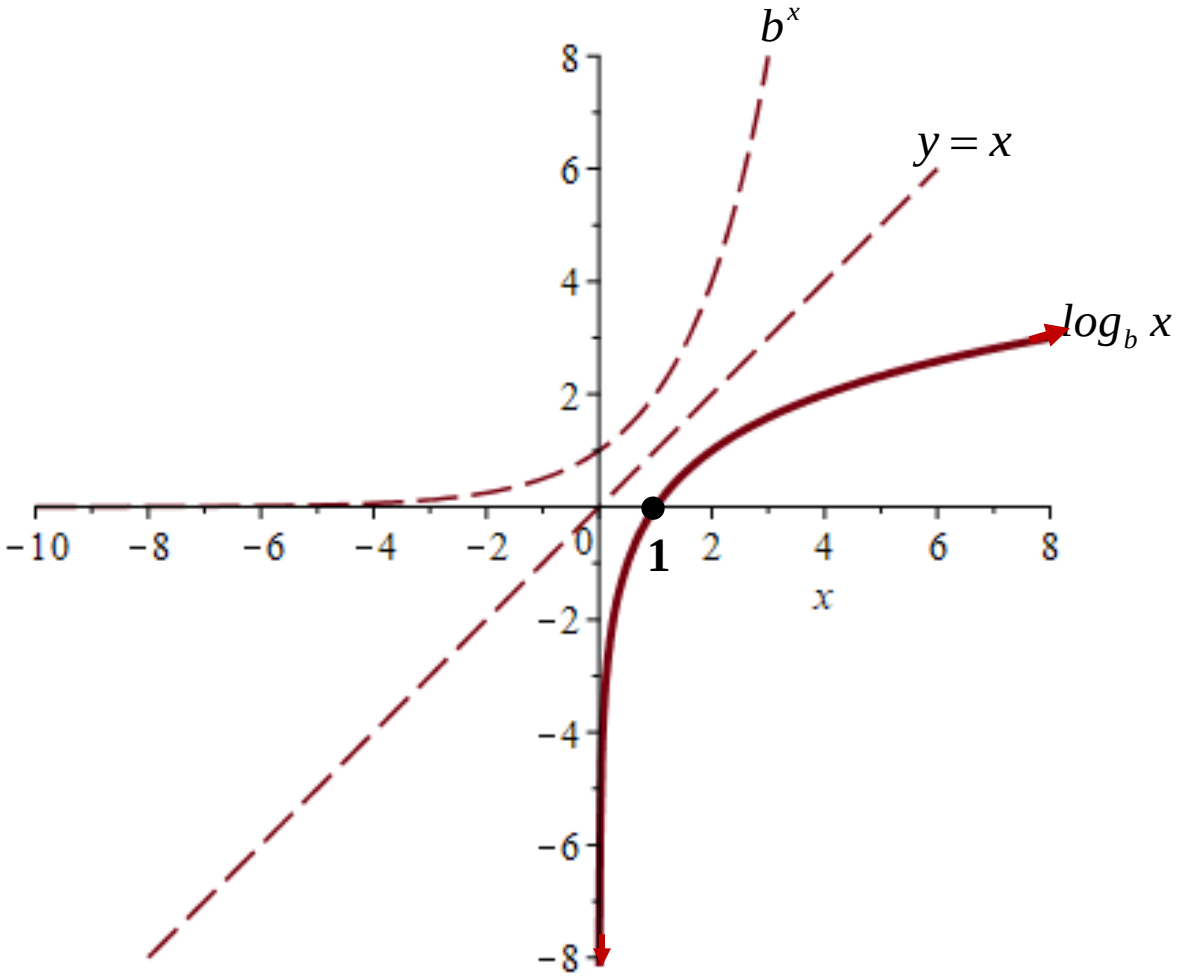
$$b > 1$$

And

$$0 < b < 1$$



For $b > 1$,



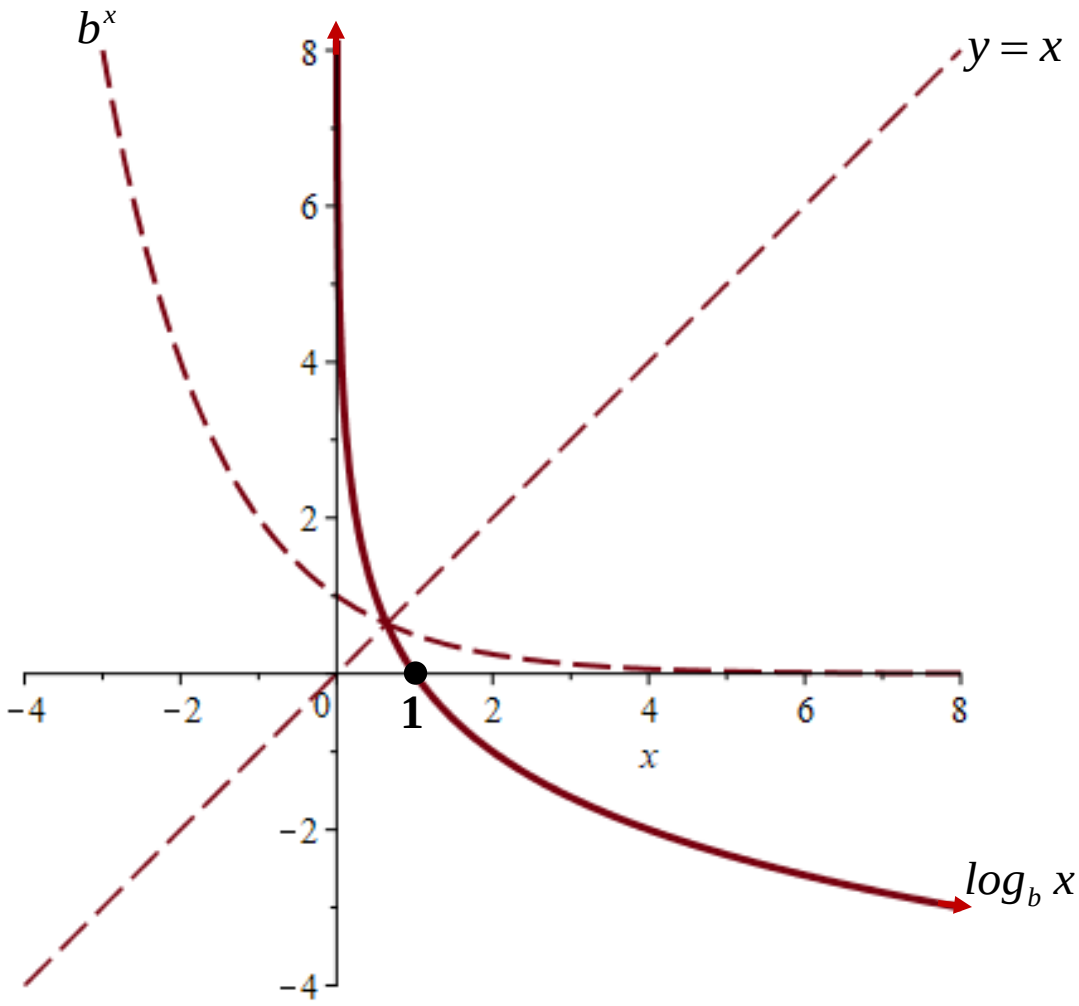
Domain: $(0,\infty)$

Vertical Asymptote: $x = 0$ **from the right**

Range: $(-\infty,\infty)$

Increasing: $(0,\infty)$

For $0 < b < 1$**,**



Domain: $(0,\infty)$

Vertical Asymptote: $x = 0$ **from the right**

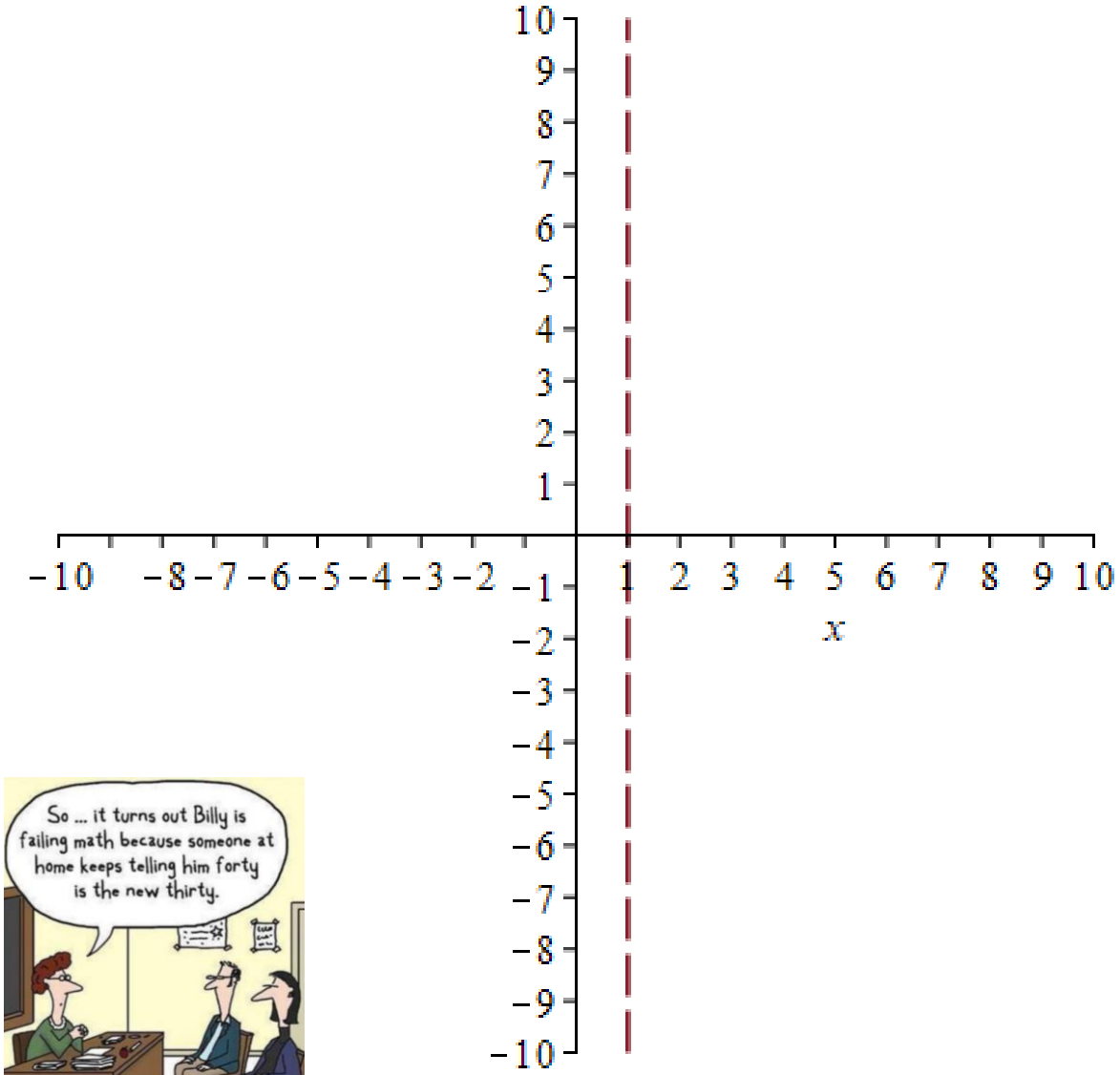
Range: $(-\infty,\infty)$

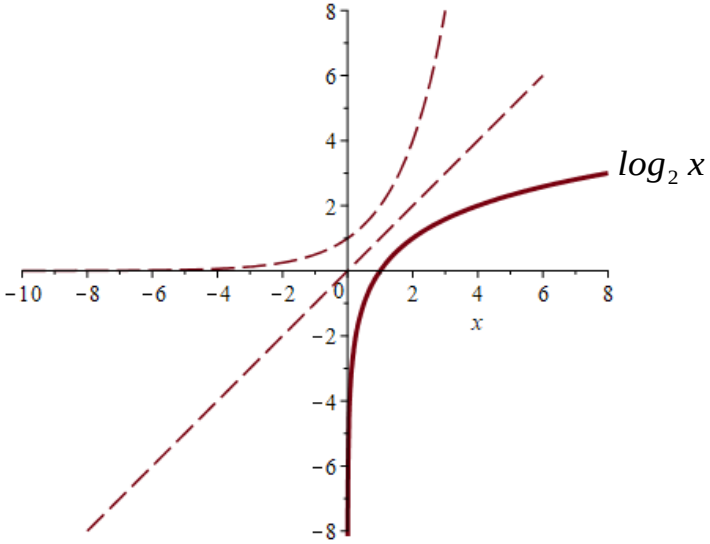
Decreasing: $(0,\infty)$

Me Trying To Figure Out Why My Friend
Asked Me For Logarithm Table on English Exam

Transformations of Logarithmic Functions:

1. $f(x) = log_2(x-1)$

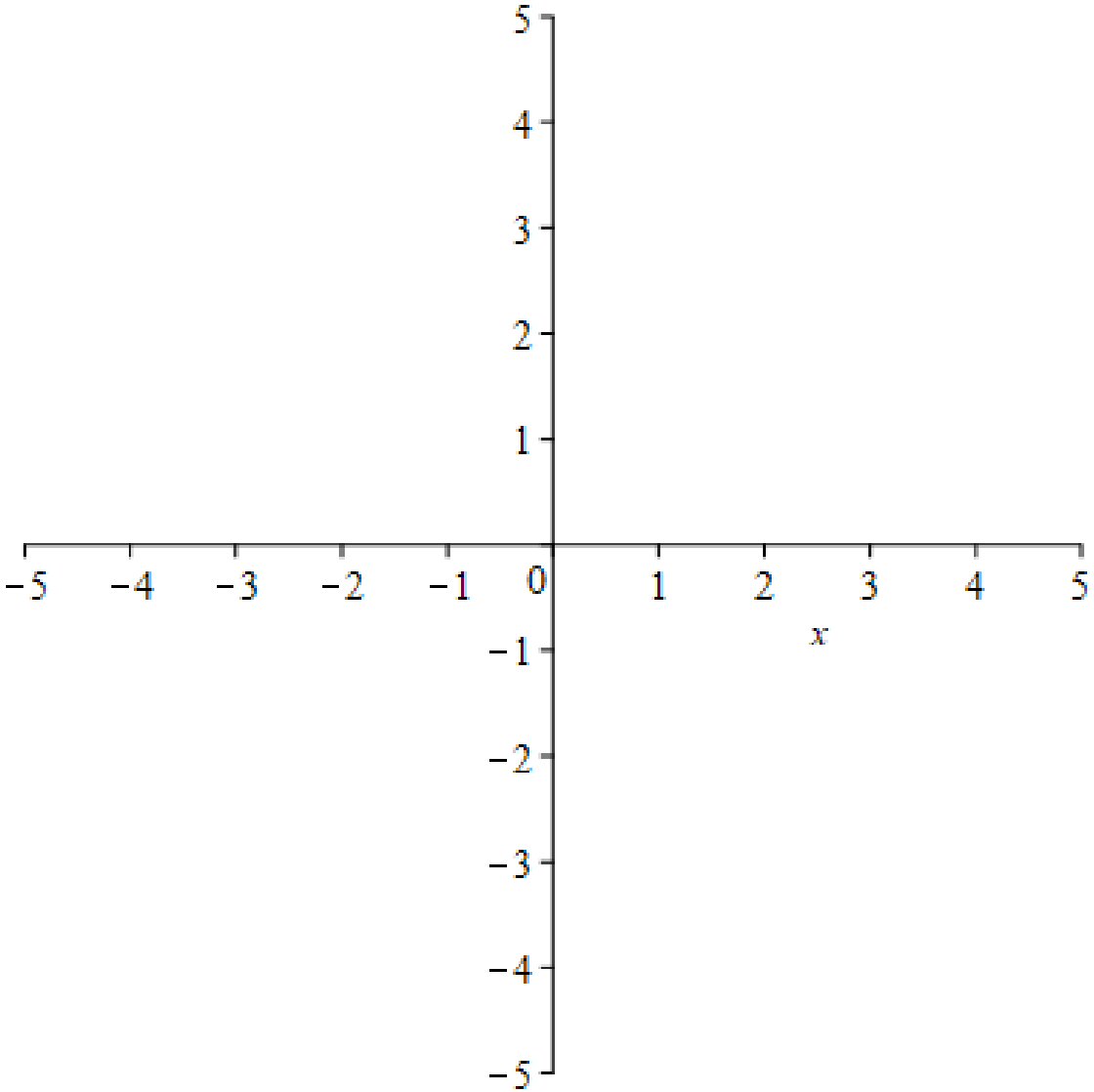


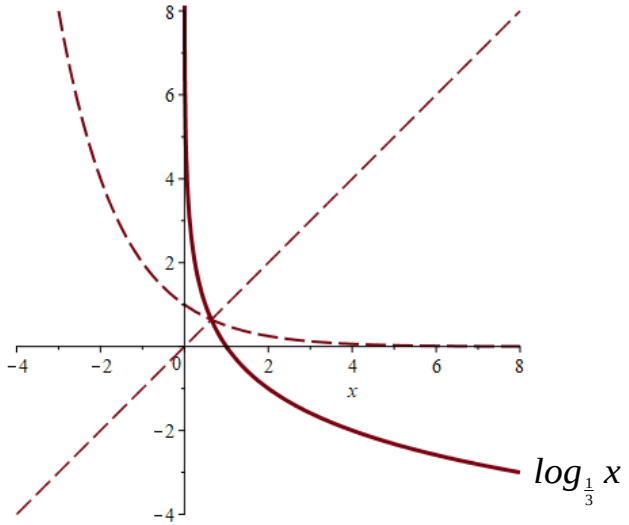


Domain:

Range:

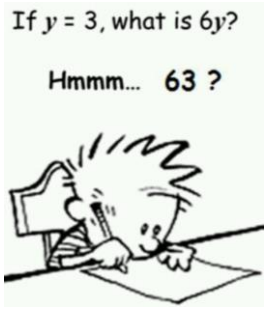
2. $f(x) = log_{\frac{1}{3}}(-x)$



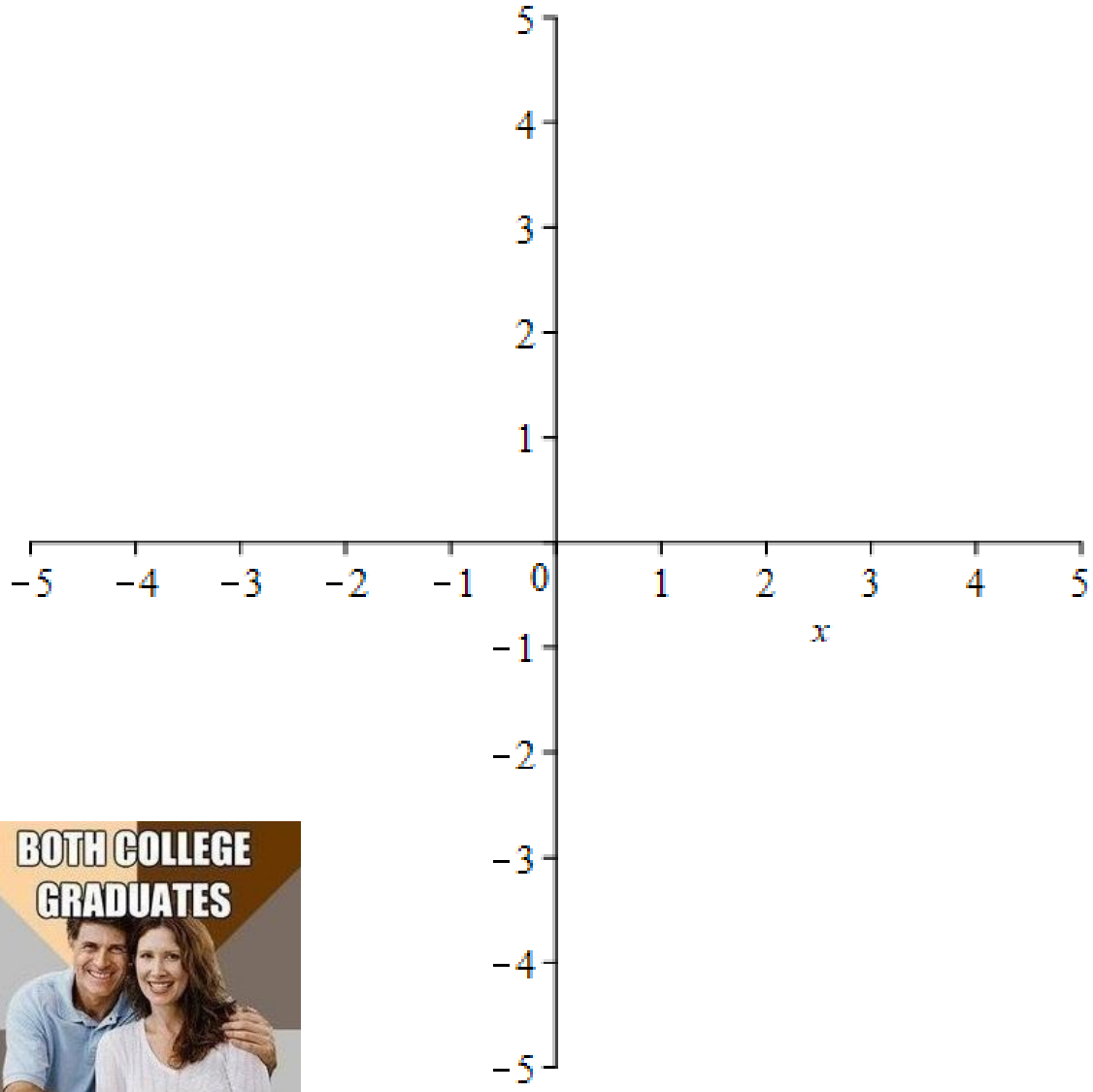


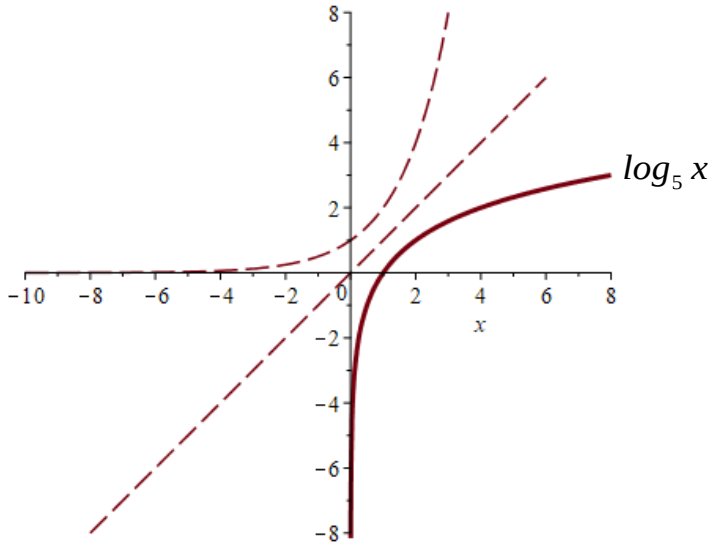
Domain:

Range:



3. $f(x) = log_5 x + 1$

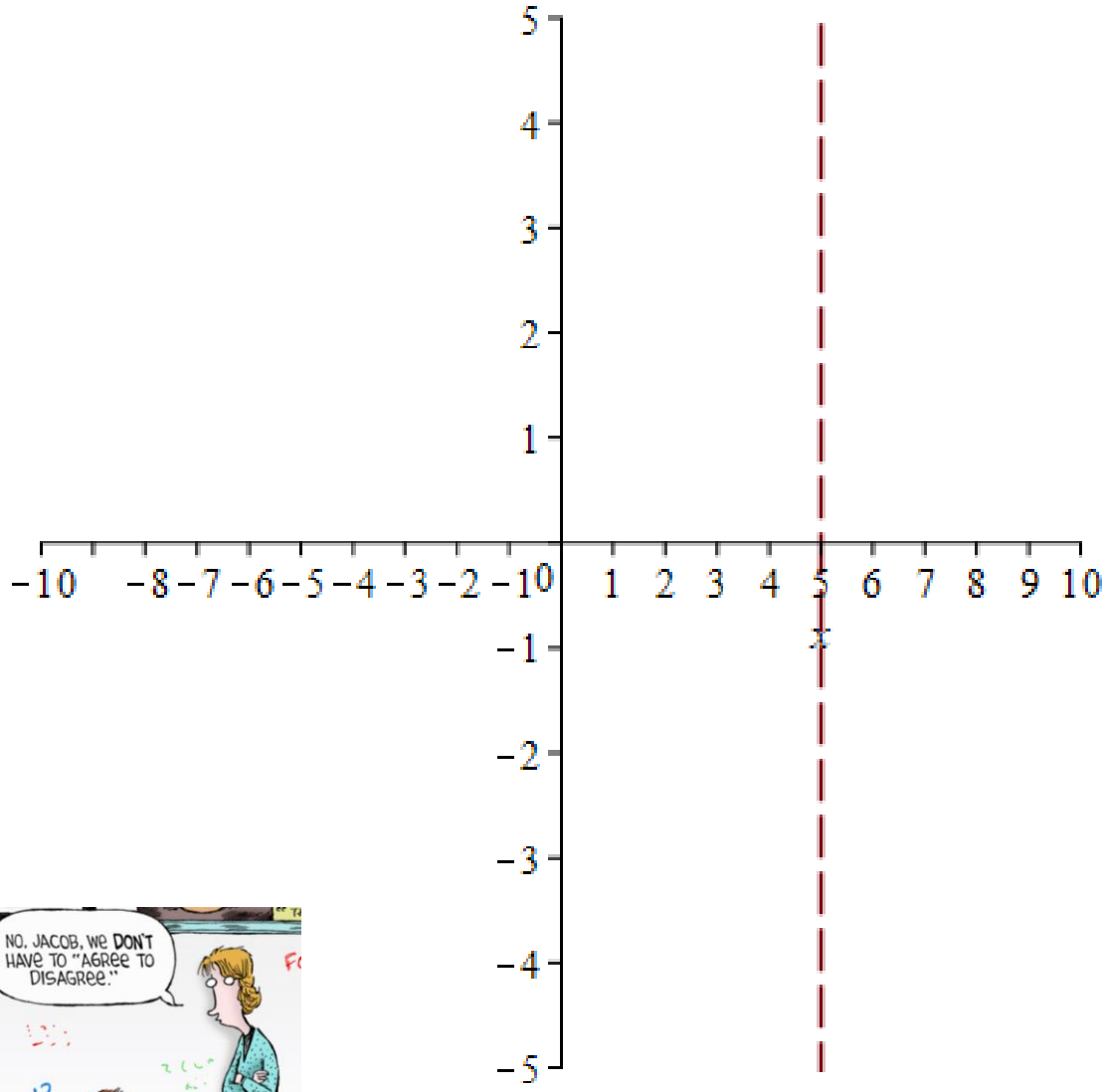


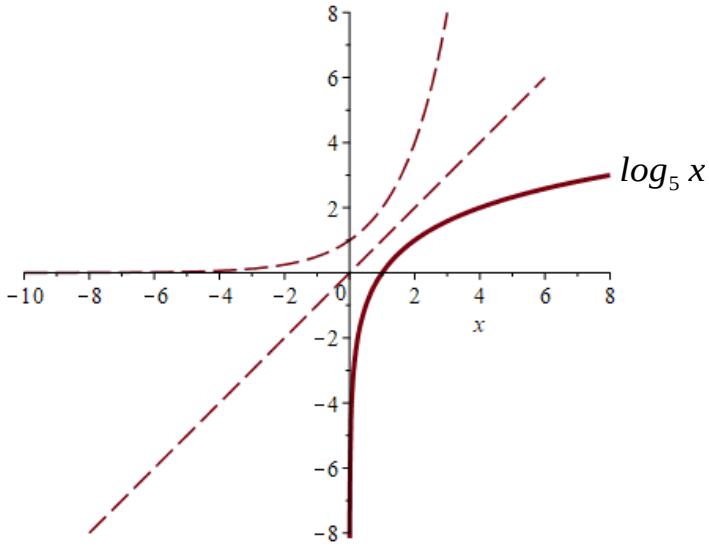


Domain:

Range:

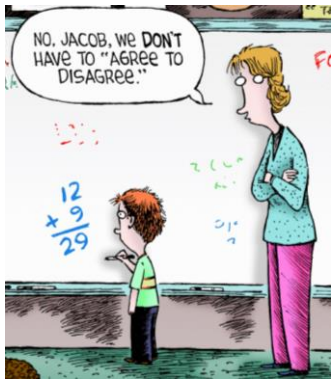
4. $f(x) = log_5(5 - x)$





Domain:

Range:



Logarithms are actually exponents. $log_b\, x$ **is the power or exponent that you raise** ***b*** **to in order to get** ***x*.**

1. $log_8 8$

2. $log_3 9$

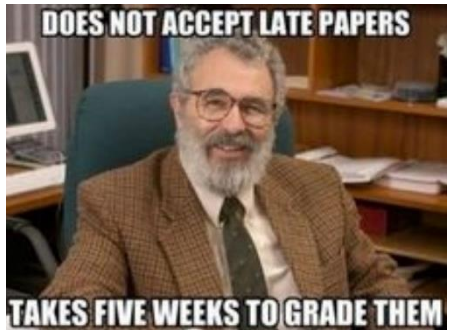
3. $log_2 \frac{1}{4}$

4. $log_{\frac{1}{2}} 8$

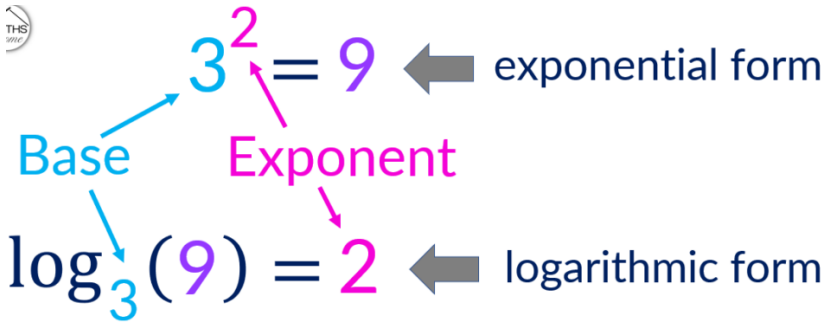
5. $log_6 \sqrt{6}$

6. $log_5 \sqrt[3]{25}$

7. $log_{\sqrt{3}} 9$



Logarithmic and Exponential Form of Equations:



Logarithmic Form:

$$3 = log_{10} 1{,}000$$

Exponentiate to get the exponential form.

Exponential Form:

$$3^4 = 81$$

Apply a logarithmic function to get the logarithmic form.

An Important Logarithmic Property:

$$log_b\left(b^x\right) = x; \text{for all } x$$

$$b^{log_b x} = x; \text{for } x > 0$$

Solve the following logarithmic equations:

1. $log_5 x = 2$

2. $log_3(3x-2) = 3$

Inverse property of logarithms $\log_b b^x = x$ $b^{\log_b x} = x$

3. $log_x 4 = 2$

4. $log_4 64 = x$

"First you forget logarithms. Then you forget how to do long division. Then the multiplication table begins to go . . ."

5. $log_3\left(x^2+1\right) = 2$

6. $log_5\left(x^2+4x+4\right) = 2$