Objective 2 - Convert Between Forms

Convert between logarithmic and exponential forms of a function.

Link to section in online textbook.

First, watch this video on converting between logarithmic and exponential functions and this video learn how to use these conversions to solve an equation. We use the conversion:

$$y = \log_b(x) \leftrightarrow x = b^y$$

This portion of the homework is short so that if you know it, you can keep moving forward. If you don't, use the "Another" button to keep reloading new questions until you feel comfortable.

Question 1 *Convert the function below to exponential form.*

$$y = \log_9(x-2) + 1$$

$x = \boxed{9^{y-1} + 2}$

Hint: *Do you have it in the form something = $\log_b$ something? It may help to color-code where things are moving in the conversion formula and in the question.*

Question 2 *Convert the function below to logarithmic form.*

$$y = 4^{x-6} - 1$$

$x = \log_{\boxed{4}}(\boxed{y+1}) + \boxed{6}$

One of the more common reasons to change forms is to solve Logarithmic equations. Remember: you want to get it in the form something = $\log_b$ something *before* trying to convert. Try solving a few logarithmic equations below.

Learning outcomes:

Author(s): Darryl Chamberlain Jr.

Question 3 *Solve the logarithmic equation below.*

$$\log_4(-3x) = 8$$

$x = \boxed{-21845.333}$

Question 4 *Solve the logarithmic equation below.*

$$\log_4(-3x) = 4$$

$x = \boxed{-85.333}$

Question 5 *Solve the logarithmic equation below.*

$$\log_2(3x+5) + 8 = \frac{5}{6}$$

$x = \boxed{-1.664}$

Question 6 *Solve the logarithmic equation below.*

$$\log_3(3x-3) + 4 = -\frac{5}{4}$$

$x = \boxed{1.001}$

Question 7 ***Main takeaway:*** *Before looking, you should work through the previous problems. Have you finished working through the examples?* $\boxed{Yes}$

Feedback(*`correct`*): *The conversion*

$$y = \log_b(x) \leftrightarrow x = b^y$$

is extremely useful in mathematics. This is the only way (so far) that we could solve an equation like $3 = \log_4(x)$. To solve exponential equations, we could use this conversion. However, it will be more useful to learn a new technique in the next section.