Warm Up

Find the inverse of each of the following

$$y = 2^{x-3} + 4$$

$x = 2^{y-3} + 4$

$-4 \quad -4$

$x - 4 = (2)^{y-3}$

$\log_2(x-4) = y-3$

$y = \log_2(x-4) + 3$

$$y = 3^{x+1} - 5$$

$x = 3^{y+1} - 5$

$+5 \quad +5$

$x + 5 = 3^{y+1}$

$\log_3(x+5) = y+1$

$\log_3(x+5) - 1 = y$

Finding the inverse of a logarithmic function.

1) Switch the input and output, x and y, variables.

2) Isolate the logarithmic expression

3) Convert to an exponential expression

4) Isolate y

Example:

$$y = log_4 x$$

$$x = log_4 y$$

$$4^x = y$$

$$y = log_4(x) + 1$$

4p1

$x = \log_4(y) + 1$

$-1 \qquad -1$

$x - 1 = \log_4(y)$

$4^{x-1} = y$

Right

$$y = log_4(x - 1)$$

Right 1

$$x = log_4(y - 1)$$

$$4^x = y - 1$$

+1 +1

$$y = 4^x + 1$$

up 1

$$y = log_2(x+3) - 1$$

Left 3 down 1

$x = \log_2(y+3) - 1$

+1 +1

$x+1 = \log_2(y+3)$

$2^{x+1} = y+3$ Left 1

$y = 2^{x+1} - 3$ down 3

$$y = log_5(x - 4) + 3$$

$x = \log_5(y-4) + 3$

$-3 \qquad\qquad -3$

$x - 3 = \log_5(y-4)$

$5^{x-3} = y - 4$

$5^{x-3} + 4 = y$

Practice with Inverses of logarithms