Name _____ Date _____

Math 111: Final Review 3b

For the following functions $f(x)$:

a) Find $f^{-1}(x)$ including its domain and range.

b) Compute and interpret $f^{-1}(0)$. Simplify, but keep as an exact answer.

1) $f(x) = 9 - 4\log_3(x+5)$

$y = 9 - 4\log_3(x+5)$

$x = 9 - 4\log_3(y+5)$

$\frac{x-9}{-4} = \frac{-4\log_3(y+5)}{-4}$

$3^{\frac{x-9}{-4}} = 3^{\log_3(y+5)}$

$3^{\frac{x-9}{-4}} = y+5$

$3^{\frac{x-9}{-4}} - 5 = y = f^{-1}(x)$

$f^{-1}(0) = 3^{9/4} - 5$

2) $f(x) = 5 - 6\log(x-7)$

$x = 5 - 6\log(y-7)$

$\frac{x-5}{-6} = \frac{-6\log(y-7)}{-6}$

$10^{\frac{x-5}{-6}} = 10^{\log(y-7)}$

$10^{\frac{x-5}{-6}} = y-7$

$10^{\frac{x-5}{-6}} + 7 = y = f^{-1}(x)$

$f^{-1}(0) = 10^{5/6} + 7$

3) $f(x) = 8 - 3\log_5(x+4)$

$x - 8 = -3\log_5(y+4)$

$\frac{x-8}{-3} = \log_5(y+4)$

$5^{\frac{x-8}{-3}} = y+4$

$5^{\frac{x-8}{-3}} - 4 = y = f^{-1}(x)$

$f^{-1}(0) = 5^{8/3} - 4$

4) $f(x) = -4 + 3\log_2(x+1)$

$$f^{-1}(x) = 2^{\frac{x-4}{3}} - 1$$

$$f^{-1}(0) = 2^{-4/3} - 1$$

5) $f(x) = 6 + 3\ln(x-2)$

$$f^{-1}(x) = e^{\frac{x-6}{3}} + 2$$

$$f^{-1}(0) = e^{-2} + 2$$

6) $f(x) = -3 + 3\log_3(3-x)$

$$f^{-1}(x) = -3^{\frac{x+3}{3}} + 3$$

$$f^{-1}(0) = 0$$