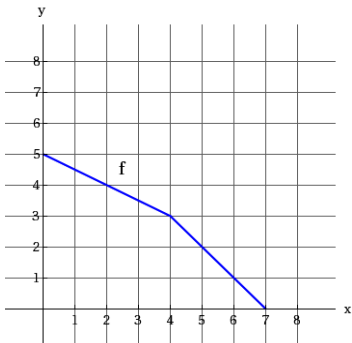Group #: _____   Name: _____

1. (6 points) Given the graph of f, find (a) $f^{-1}(2)$, (b) $f^{-1}(5)$, and (c) $f^{-1}(6)$

2. (30 points, 10 points each) (a) Find the inverse function of the following functions. (b) Use Inverse Function Property (cancellation property) to show that the inverse function you found for each part works.

   (a) $f(x) = \dfrac{x-5}{3x+4}$

   (b) $f(x) = 4 - x^2$, $x \geq 0$ (why do we need to have this extra condition?)

   (c) $f(x) = 4 + \sqrt[3]{x}$

3. (24 points, 8 points each) Manipulate the following expressions/equations involving logarithmic and exponential functions.

   (a) Express $\ln(x-1) = -4$ in exponential form.

   (b) Express $e^{x+1} = 0.5$ in logarithmic form.

   (c) Solve $3 - \log_3(5x+7) = 4$. Leave your answer in the exact form.

4. (8 points) Evaluate the following expression without using a calculator

$$\log_8 0.25 - \log_6 1 + 10^{\log_{10} 87} + 2\ln\left(\frac{1}{e}\right) - e^{\ln \pi^2}.$$

5. (12 points) Given $f(x) = \sqrt{x+1}$. (a) Sketch the graph of f. (b) Use the graph of f to sketch the graph of f^{-1}. (c) Find f^{-1}.

6. (6 points each) Graph the following functions, not by plotting points, but by starting from their respective standard graph.

   (a) $g(x) = \ln(x+2)$

   (b) $g(x) = \log_6(-x)$

7. (8 points) Find the **domain, range**, and **asymptote** of the function $f(x) = 3 + \log_5(8 - 2x)$.