

Instructions: Show all work. Use exact answers unless specifically asked to round. Answer all parts of each question.

1. Sketch the graph of $f(x) = -e^{x/2} + 2$. Then find the inverse of $f(x)$ and sketch that function on the same graph.

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

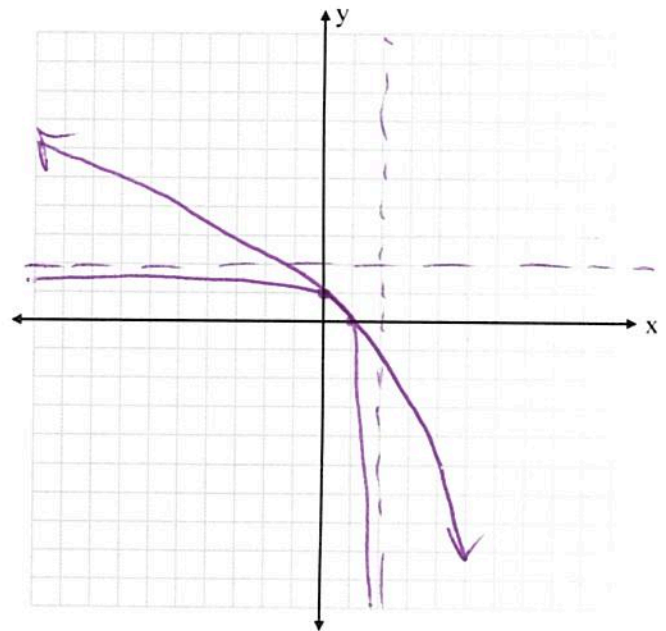
$$x = -e^{y/2} + 2$$

$$x - 2 = -e^{y/2}$$

$$2 - x = e^{y/2}$$

$$\ln(2 - x) = y/2$$

$$2 \ln(2 - x) = y = f^{-1}$$



2. State the domain and range of the functions:

a. $f(x) = \left(\frac{1}{2}\right)^{x-1} - 2$

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

R: $(-2, \infty)$

b. $g(x) = \log\left(\frac{x+1}{x-5}\right)$

D: $(-\infty, -1) \cup (5, \infty)$

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

$$\frac{x+1}{x-5} \geq 0$$

$$\begin{array}{c} + \quad - \quad + \\ \hline -1 \quad 5 \end{array}$$

3. Solve the equation for x.

a. $e^x = 1$

$x = 0$

b. $\left(\frac{1}{2}\right)^x = 8$

$(2^{-1})^x = 2^{-x} = 2^3 \quad x = -3$

c. $\log_2 x = 6$

$x = 2^6 = 64$

4. Evaluate the expression $\log_5(3^{\log_3 5})$

$3^{\log_3 5} = 5$

$\log_5(5) = 1$

