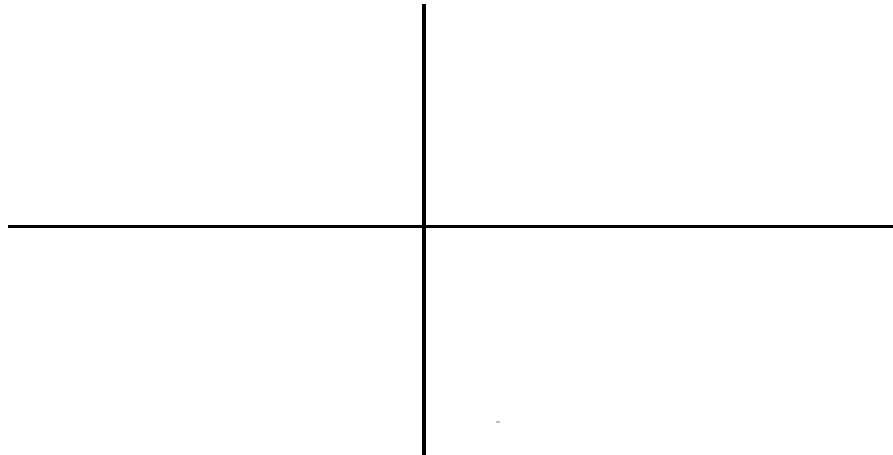


*Directions:* Answer each question as completely as possible. Show all work for credit. Good luck.

1. Suppose  $f(x) = 4^{x-2} - 1$

- a) What is the  $y$ -intercept of  $f$ ?
- b) What is the  $x$ -intercept of  $f$ ?
- c) Find the equation of any asymptotes to the graph of  $f$ .
- d) Sketch a rough graph of  $f$  using the axes provided.



2. Evaluate each of the following logarithmic expressions:

a)  $\ln 1$

b)  $\log_8 32$

c)  $\log_4 6 - \log_4 96$

d)  $\frac{\log_5 216}{\log_5 6}$

e)  $25^{\log_5 7}$

3. Solve each of the following equations for  $x$ .

a)  $4^{3x+2} = 71$

b)  $4^{3x+2} = 8^{x-2}$

c)  $\log_7(5 - 2x) = \log_7 x + \log_7(15 - 6x)$

d)  $\ln(x + 3) = 4$