

# Math 1513 - College Algebra

Exam #3 - 2018.12.03

Name: \_\_\_\_\_

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1. Solve the following equation for  $x$ :  $e^x e^2 = \frac{e^4}{e^{x+1}}$ .

2. Solve the following equation for  $z$ :  $\log_5(z - 2) + \log_5(2z - 3) = 2 \log_5(z)$ .

3. The following is the graph of an invertible function  $f(x)$  whose domain is  $(-\infty, 2) \cup (2, \infty)$  and whose range is  $(-\infty, 3/4) \cup (3/4, \infty)$ . On the same graph, sketch the inverse function, along with all possible vertical/horizontal asymptotes.

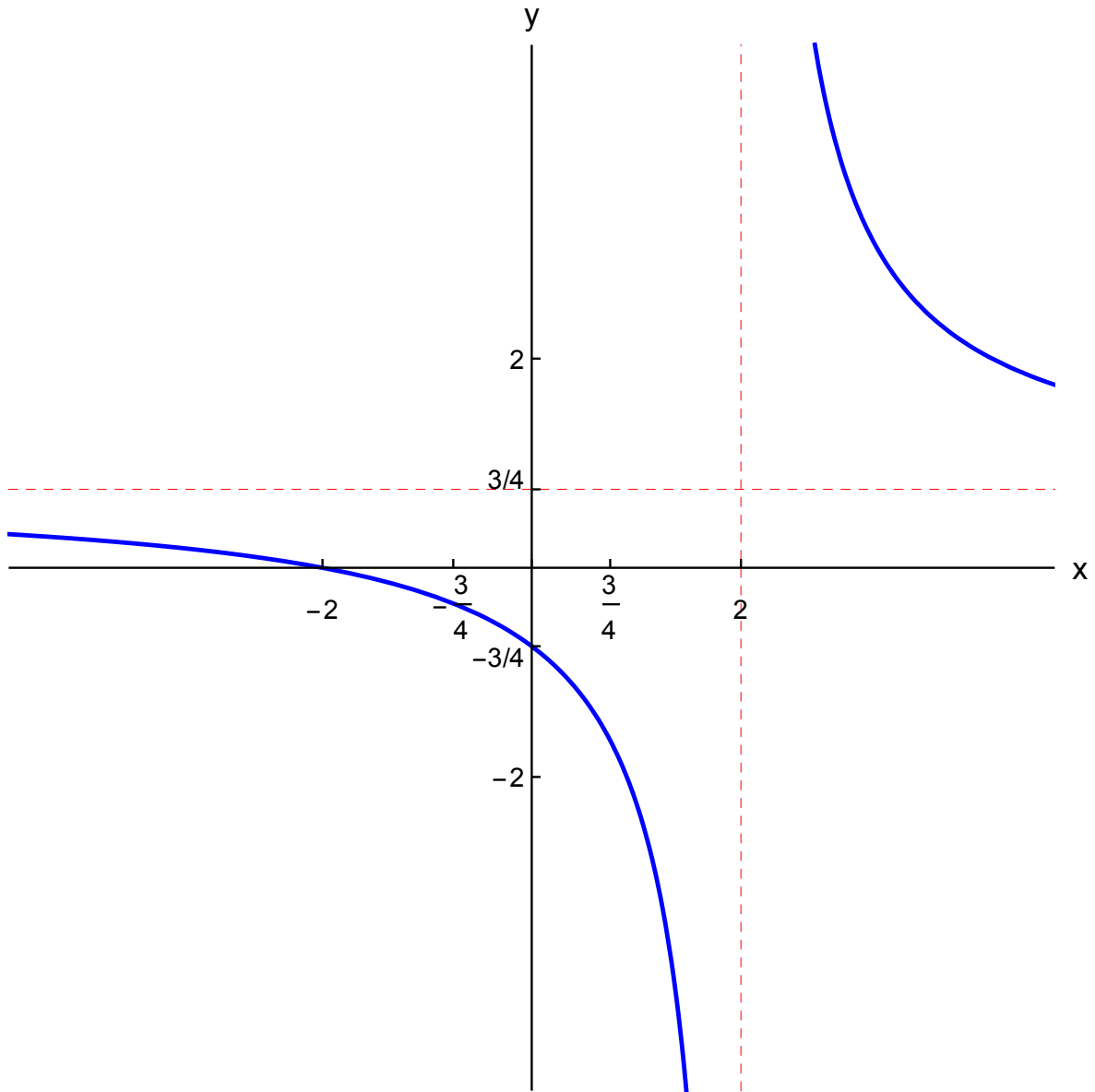


FIGURE 1. Graph of the invertible function  $f(x)$ .

4. If  $f(x) = \frac{3x+6}{4x-8}$ , find the inverse function to  $f(x)$ . (Note,  $f(x)$  does pass the horizontal line test, so is invertible.)

5. Solve the following system of linear equations:

$$\begin{cases} 2x + 4y = 14, \\ -x + 2y = 5 \end{cases}$$

6. Solve the following system of linear equations:

$$\begin{cases} x - y - z & = 0, \\ 2x + y - 3z & = -5, \\ -x + 3y + 2z & = 0 \end{cases}$$

7. Solve the following system of nonlinear equations:

$$\begin{cases} 2x^2 + y^2 = 24, \\ x^2 - y^2 = -12 \end{cases}$$

8. Solve the following system of linear inequalities by graphing the solution region. *Be sure to clearly define your region.*

$$\begin{cases} y < -2x + 6, \\ y > -\frac{1}{3}x + 1, \\ y < \frac{1}{2}x + 1 \end{cases}$$