1. Find the inverse function of \( f(x) = \frac{x^3 - 2}{8} \). (4 pts)

2. Sketch the following graphs: Be sure to label any asymptotes and intercepts for each graph. (8 pts)
   
   (a) \( y = -e^x \).

   (b) \( y = \log_3(x + 3) \).

3. (8 pts)
   
   (a) Simplify: \( e^{2\ln(3)} + \ln(e^2) \)
(b) Rewrite as a single logarithm: $3 \log_2(q) - 17 \log_2(m) + \log_2(r)$

4. The image below contains the graph of the function $g(x)$ and the line $y = x$. Use the given graph to answer the following: (12 pts)

(a) Is $g(x)$ one-to-one? In a brief sentence explain why or why not.

(b) Sketch the graph of $g^{-1}(x)$ on the same graph given above.

(c) State the domain and range of $g^{-1}(x)$
5. Solve the following equations: (20 pts)

(a) \( \log_2 8 = 2 \)

(b) \( 3x = 2 - x \ln 7 \)

(c) \( e^{x+1} = e^{x^2+1} \)

(d) \( \log_2 (x^2 - 4x) - \log_2 (3) = 2 \)
6. A hot cup of tea is served at a Sunday breakfast. Its temperature can be modeled by Newton’s Law of Cooling so that its temperature at time \( t \) is given by \( T(t) = 60 + 140e^{-0.05t} \) where \( t \) is measured in minutes and \( T \) is measured in Fahrenheit \(^\circ F\). Give the exact answers. (12 pts)

(a) What is the initial temperature of the tea?

(b) What is the temperature after 100 minutes?

(c) How long will it take for the temperature to reach 100 degrees?

7. Sketch each angle in standard position on the unit circle. (8 pts)

(a) \( \frac{\pi}{6} \)

(b) \( -\frac{2\pi}{3} \)
8. Find the area of a sector of a circle with a central angle $\frac{2\pi}{3}$ radians and radius $r = 3$. (Give your answer in exact form.) (4 pts)

9. Find the following: (20 pts)

   (a) $\sin (30^\circ)$

   (b) $\cos (180^\circ)$

   (c) $\tan \left( \frac{3\pi}{4} \right)$

   (d) $\cos \left( -\frac{5\pi}{6} \right)$

10. Given $\sin \theta = -\frac{1}{5}$: (4 pts)

    (a) Find $\csc \theta$.

    (b) If you also know $\tan \theta > 0$ find $\cos \theta$. 