1. (10) Let \( f(x) = e^{x^3} + 4 \). Answer the following questions, in some cases the answer could be NONE or N/A.
   a. Sketch the graph
   b. Domain and Range
   c. \( x \) and \( y \) intercepts
   d. The equation of the horizontal and vertical asymptotes
   e. End behavior and behavior near vertical asymptotes.

2. (10) Find the domain of the following functions:
   a. \( h(x) = \sqrt{\frac{x^2 + 2x - 3}{x - 4}} \)
   b. \( f(x) = \ln x + \ln(2 - x) \)

3. (20) Solve the following equations.
   a. \( 3xe^x + x^2e^x = 0 \)
   b. \( 4 + 3\log(2x) = 16 \)
   Choose two out of the following three equations
   c. \( \sin 2x + \cos x = 0 \) in the interval \([0, 2\pi)\)
   d. \( 2 \cos^2 x + \sin x = 1 \) in the interval \([0, 2\pi)\)
   e. \( \cos x + 1 = \sin x \) in the interval \([0, 2\pi)\)

4. (16) Find the exact value of the following trigonometric functions:
   a. \( \cos \left( \frac{25\pi}{4} \right) \)
   b. \( \sec(-13\pi) \)
   c. \( \sin 15^\circ \)
   d. \( \cos 10^\circ \cos 80^\circ - \sin 10^\circ \sin 80^\circ \)

5. (6) Find the amplitude, period, and phase shift. State the domain and range.
   \( y = \frac{3}{4} \cos(2x + \frac{2\pi}{3}) \)
6. (6) Find the period and graph the following function showing any important points and vertical asymptotes. State the domain and range.

\[ y = \tan 2(x - \pi/4) \]

7. (9) Sketch a triangle to evaluate \( \cos \left(2 \tan^{-1}(3/2)\right)\)

8. (15) A tunnel is to be built through a mountain. To estimate the length of the tunnel, distance between A and B, a surveyor makes the following measurements: distance between A and C \(\approx 5\) km; distance between B and C \(\approx 4\) km; angle ACB=60°. Find the length of the tunnel.

9. (8) Choose either a or b and verify the equality.
   a. \[ \cos^2 x - \sin^2 x = 2 \cos^2 x - 1 \]
   b. \[ 2 \tan x \sec x = \frac{1}{1 - \sin x} - \frac{1}{1 + \sin x} \]

EXTRA CREDIT

10. (10) Given the function \( f(x) = \tan(2x) \)
    a. State the domain so that \( f(x) \) is one-to-one.
    b. State its range.
    c. Find \( f^{-1}(x) \) and state its domain and range.