1) Graph the following equations:
   a) \( y = 2 \cos \left( 3x + \frac{\pi}{2} \right) - 1 \)
   b) \( y = -2 \tan \left( x + \frac{\pi}{2} \right) \)
   c) \( y = \csc \left( \pi x - \frac{\pi}{2} \right) + 3 \)

2) List all values of \( x \) for which the function \( g(x) = - \tan \left( 4x + \frac{\pi}{2} \right) \) has vertical asymptotes.

3) To measure the height of a building, two sightings, 50 feet apart from one another, are taken from one side of the building. If the first angle of elevation is 50° and the second is 32°, what is the height of the building?

4) Two observers simultaneously measure the angle of elevation of a helicopter (one from each side). One angle is measured as 25° and the other as 40°. If the observers are 100 feet apart, and the helicopter lies over the line joining them, how high is the helicopter?

5) Evaluate the following expressions:
   a) \( \sin(\sin^{-1} 1) \)
   b) \( \sin(\sin^{-1} 2) \)
   c) \( \cos \left( \arccos \left( \frac{\sqrt{2}}{2} \right) \right) \)
   d) \( \arccos \left( \cos \left( -\frac{5\pi}{6} \right) \right) \)
   e) \( \tan \left( \cos^{-1} \left( -\frac{\sqrt{2}}{2} \right) \right) \)
   f) \( \tan \left( \sin^{-1} \left( \frac{1}{3} \right) \right) \)
   g) \( \cos^{-1} \left( \sin \left( \frac{\pi}{3} \right) \right) \)
   h) \( \cos^{-1} \left( \sin \left( \frac{8\pi}{7} \right) \right) \)

6) Rewrite as an algebraic expression:
   a) \( \tan(\arcsin u) \)
   b) \( \csc \left( \cos^{-1} \left( \frac{x}{3} \right) \right) \)

7) Simplify:
   \[
   \frac{\cos^3 \theta - \sin^3 \theta}{1 + \cos \theta \sin \theta}
   \]

8) An aircraft takes off a runway which has a bearing of N15°E. After flying for 1 mile, the pilot of the aircraft requests permission to turn 90° and head toward the north west. The request is granted. After the plane goes 2 miles in this direction, what bearing should the control tower use to locate the aircraft?

9) The moon is directly over Gainesville when, due to an experiment in the physics department, it explodes, and a shard of lunar rock hurtles toward Paynes Prairie at 200 miles/sec. If the shard makes a descent angle with the horizon of 15° how many minutes will it take the shard to descend 12,000 miles?
10) Verify each identity:
   a) \( \frac{1-\sin \theta}{\cos \theta} + \frac{\cos \theta}{1-\sin \theta} = 2 \sec \theta \)
   b) \( \frac{\csc \theta + \cot \theta}{\cot \theta} = \frac{\tan^2 \theta}{\sec \theta - 1} \)
   c) \( \csc^6 x \cot x = (\cot x + 2 \cot^3 x + \cot^5 x) \csc^2 x \)

11) Evaluate:
    a) \( \tan \left( -\frac{17\pi}{2} \right) \)
    b) \( \cos \left( -\frac{7\pi}{3} \right) \)
    c) \( \sin \left( \frac{11\pi}{6} \right) \)
    d) \( \cot \frac{7\pi}{4} \)
    e) \( \csc(390^\circ) \)
    f) \( \sec(-540^\circ) \)

12) Given the following values, find the values of the other five trig functions for the same angle:
    a) \( \sin \theta = \frac{1}{3} \)
    b) \( \cot \theta = 3 \)

13) Write three equations for the graph below. At least one of the equations should have a different trigonometric function from the other.

14) The terminal side of \( \theta \) lies on the line \( x + 2y = 0 \) in the quadrant IV. Find the values of the six trigonometric functions of \( \theta \).

15) a. Given that \( \cos(\theta) = \frac{1}{4} \), find \( \cos(90 - \theta) \).
    b. Given that \( \cot(\theta) = 3 \), find \( \cos(90 - \theta) \).