1) Find a formula for the following graph displayed below:

2) Given the following function: $f(t) = -5 \cos\left(4\pi - \frac{4\pi}{6}\right) - 3$

Find the amplitude, the period, the phase shift, and the midline. Draw one period.

3) Find $a$, $b$, and $\alpha$.

4) The base of a ladder is 8.5 ft from the building, and the angle formed by the ladder and the ground is 69°. How high up the building does the ladder touch?

5) Find a formula for the following graph:

6) If $P = (-3, 4)$ is on the terminal side of an angle in standard position. Find the six trigonometric functions.

7) Verify that:
   a) $\cos 2x = \frac{1 - \tan^2 x}{1 + \tan^2 x}$
   b) $(\sin x + \cos x)^2 = 1 + \sin 2x$

8) Determine the amplitude, the period, the phase shift and the vertical shift of the following function and draw one period:
   $y = -4 \sin \left(\frac{2}{3} x - \frac{\pi}{3}\right) - 2$
Verify the following identities:

9) a) \( \sin \theta \sec \theta = \tan \theta \)  
   b) \( \frac{1 + \cos x}{1 - \cos x} = \frac{\sin^2 x}{(1 - \cos x)^2} \)  
   c) \( \cos^2 x - \sin^2 x = 1 - 2 \sin^2 x \)  
   d) \( \frac{1 + \sec x}{\sin x + \tan x} = \csc x \)  
   e) \( \frac{1 - (\sin x - \cos x)^2}{\sin x} = 2 \cos x \)

10) solve the following: \( \sin x \cos x = -\frac{1}{2} \), \( 0 < x < 2\pi \)

11) Solve the following: a) \( 6 \cos(t) + 4 = 0 \)  
   b) \( \sin^2 t + \sin t - 20 = 0 \)  
   c) \( \sin^2 \theta + 2 \sin \theta - 1 = 0 \)

12) Solve the following (Find \( \theta \)): \( \sin(2\theta) + \cos(\theta) = 0 \)

13) a) \( c = 3, b = 4, \gamma = 40^\circ \)  
   b) \( a = 3, c = 7, \alpha = 70^\circ \)

14) An airplane flies from city A to city B, a distance of 150 miles, then turns through an angle of 40° and heads toward city C. If the distance between A and C is 300 miles, how far is it from city B to city C?

   Through what angle should the pilot turn at city C to return to city A?

15) Find a formula for the following:

16) Two ships set sail with bearings of 52° and 121°, traveling at 20 miles per hour and 14 miles per hour respectively. Approximate the distance between the ships after 1.5 hours.

17) Solve the following: \( 2 \sin^2 \theta + \sin \theta - 3 = 0 \)