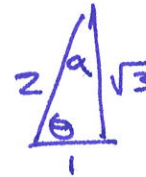**Instructions**: Show all work. Give exact answers unless specifically asked to round.

1. Solve the equation for all angles in $[0, 2\pi)$.

   a. $\tan 3x = \frac{\sqrt{3}}{3}$ $= \frac{1}{\sqrt{3}}$

   $\tan \alpha = \frac{1}{\sqrt{3}}$ $\alpha = \frac{\pi}{6}, \frac{7\pi}{6}$

   $3x = \frac{\pi}{6}$

   $x = \frac{\pi}{18}, \frac{7\pi}{18}, \frac{13\pi}{18}, \frac{19\pi}{6}, \frac{25\pi}{6}, \frac{31\pi}{6}$

   b. $4\sin^2 x + 4\cos x - 5 = 0$

   $4(1 - \cos^2 x) + 4\cos x - 5 = 0$

   $4 - 4\cos^2 x + 4\cos x - 5 = 0$

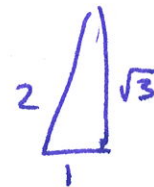 $4\cos^2 x - 4\cos x + 1 = 0$
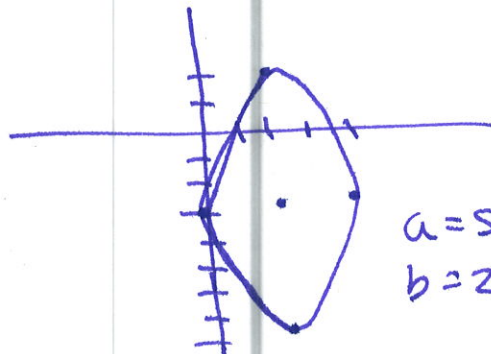
   $(2\cos x - 1)^2 = 0$

   $2\cos x - 1 = 0$

   $\cos x = \frac{1}{2}$

   $x = \pi/3, 5\pi/3$

2. Sketch the graph of the ellipse with a center at $(2, -3)$ and one endpoint of the major axis at $(2, 2)$, and one endpoint of the minor axis at $(4, -3)$. Write the equation in standard form.

   $\frac{(x-2)^2}{4} + \frac{(y+3)^2}{25} = 1$

   $a = 5$
   $b = 2$