Trig Practice with Applications

While working in a group make sure you:

- Expect to make mistakes but be sure to reflect/learn from them!
- Are civil and are aware of your impact on others.
- Assume and engage with the strongest argument while assuming best intent.

1. Let $\pi < \theta < \frac{3\pi}{2}$ and $\cos\theta = \frac{-8}{17}$.

   (a) There are at least two ways you can find the exact value of $\sin\theta$. Employ one of these methods to find $\sin\theta$.

   (b) Find one other method you could have used to answer (a) and do it. (Consider asking another group since they might have solved (a) differently!)

   (c) Find the exact value of $\sin(\theta + \theta)$.

2. Let $\frac{\pi}{2} < \theta < \pi$ and $\frac{-\pi}{2} < \phi < 0$. Given that $\sin\theta = \frac{3}{4}$ and that $\cos\phi = \frac{1}{5}$, find $\cos(\theta + \phi)$.

3. A satellite orbiting the earth passes directly overhead at observation stations in Phoenix and Los Angeles. At 1:15 am scientists note the satellite is between the two cities and record an angle of elevation of $60°$ at Phoenix and $75°$ at Los Angeles. Note that Phoenix is 340 miles from Los Angeles.

   (a) How far is the satellite from Phoenix at 1:15am?

   (b) How far above the ground is it?

4. A plane is flying at an elevation of 21,000 ft. It is within sight of the airport and the pilot finds that the angle of depression to the airport is $22°$. What is the distance between the plane and the airport?

5. A block is sliding down a frictionless ramp with angle of inclination of $30°$, how fast is the block accelerating in the horizontal direction?