## Additional Chapter 7 Problems

1. Prove the identity $\dfrac{\sec\theta}{\cot\theta+\tan\theta} = \sin\theta$ in the following ways:

   i. Converting the left-hand side to sines and cosines.

   ii. Multiplying the left-hand side by $\dfrac{\tan\theta}{\tan\theta}$.

2. (a) Find $\sin(\frac{7\pi}{12})$ using the angle addition formula for sine.

   (b) Find $\sin(\frac{7\pi}{12})$ using the half-angle formula for sine.

   (c) Are your answers for part (a) and (b) equal?

3. Find all of the solutions to the following equations.

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

   (b) $5\sin x + 2 = 8$

4. Find all of the solutions to $13 + 6\sin(\frac{\pi}{6}t) = 16$ in the interval $[45, 62]$.

5. You board a ferris wheel that makes one complete revolution every 30 seconds. At time 0, you begin at the lowest point of the ferris wheel which is 5 feet above the ground. The highest point of the wheel is 65 feet above the ground. What fraction of the time do you spend at least 45 feet above the ground? (Round your answer to 4 digits after the decimal.)