Additional Chapter 5 Problems

1. For each of the following parts, state the quadrant(s), if any, for which the statements are true.

   (a) $\cos t < 0$ and $\sin t > 0$

   (b) $\tan t > 0$ and $\sec t > 0$

   (c) $\csc t < 0$ and $\sin t < 0$

   (d) $\sec t > 0$ and $\cos t < 0$

2. Determine whether the function is even, odd, or neither.

   (a) $f(x) = \sin(x^3)$

   (b) $g(x) = \cos(x^3)$

   (c) $h(x) = \cos x \sin^2 x$

   (d) $j(x) = x^3 + \sin x$

   (e) $k(x) = x^3 + \cos x$

3. (a) Is $f(x) = \sin 6x + \sin 4x$ periodic? If so, what is the period of $f(x)$?

   (b) Is $g(x) = \sin \pi x + \sin 4x$ periodic? If so, what is the period of $g(x)$?

4. The number of hours of daylight per day in Seattle varies sinusoidally (can be modeled with a sine or cosine curve). On June 21st (the longest day of the year), there is approximately 16 hours of daylight and on December 21st (the shortest day of the year), there is approximately 8 hours of daylight.

   (a) Find a function that models the number of hours of daylight per day in Seattle as a function of the day of the year.

   (b) According to your model, how many hours of daylight will there be on February 21st? (The actual amount of daylight is 10 hours and 35 minutes.)

   Note: For this problem, assume that each month has 30 days, which means that each year has 360 days.