Lessons 14.1–14.4

MULTIPLE CHOICE

1. **AMUSEMENT PARK** At an amusement park, you watch your friend go on a ride that simulates free-fall. You are standing 200 feet from the base of the ride as it slowly begins to pull your friend to the top. The ride is 120 feet tall. Which equation gives your friend's distance d (in feet) from the top of the ride as a function of the angle of elevation? *TEKS a.4*

   A $d = \dfrac{250}{\tan \theta}$ **B** $d = 100 - 250 \tan \theta$

   C $d = 250 \tan \theta$ **D** $d = 100 - \dfrac{250}{\tan \theta}$

2. **BICYCLING** You put a reflector on a spoke of your bicycle wheel. As you ride your bicycle, the reflector's height h (in inches) above the ground is modeled by

   $$h = 13.5 + 11.5 \cos 2\pi t$$

   where t is the time (in seconds). What is the frequency of the function? *TEKS a.4*

   F 1   **G** $\dfrac{\pi}{2}$

   H π **J** 2π

3. **HOT AIR BALLOON** You stand 80 feet from the launch site of a hot air balloon traveling directly upward. What is the angle of elevation from you to the balloon when the balloon's height is 150 feet? *TEKS a.4*

   A 28.1°

   B 32.2°

   C 57.8°

   D 61.9°

4. **RATE OF CHANGE** In calculus, it can be shown that the rate of change of the function $f(x) = -\csc x - \sin x$ is given by this expression:
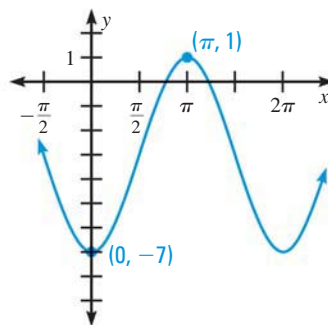
   $$\csc x \cot x - \cos x$$

   Which expression is equivalent to $\csc x \cot x - \cos x$? *TEKS a.4*

   F $\cos x$

   G $\cot^2 x$

   H $\cos x \cot^2 x$

   J $\cos x \csc^2 x$

GRIDDED ANSWER ⓪①●③④⑤⑥⑦⑧⑨

5. **AMPLITUDE** What is the amplitude of the graph shown? *TEKS a.4*

6. **ICE CREAM PRODUCTION** The number n (in millions) of gallons of ice cream produced in the United States can be approximated by

   $$n = 24.5 \sin\left(\frac{\pi}{210}t - 1.09\right) + 113$$

   where t is the time (in days) with $t = 1$ representing January 1. What value of t corresponds to the first day that 125 million gallons of ice cream will be produced? Round your answer to the nearest integer. *TEKS a.4*