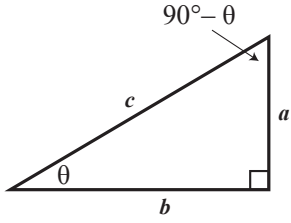
CHAPTER 4 PRACTICE QUESTIONS

Directions: Complete the following open-ended problems as specified by each question stem. For extra practice after answering each question, try using an alternative method to solve the problem or check your work.

1. Using the triangle diagram below, prove that $\tan(90 - \theta) = \frac{1}{\tan \theta}$, where θ is the indicated angle measure, in degrees.



2. Given $\csc \theta = -4/3$ and $3\pi/2 < \theta < 2\pi$, determine the values of the other five trigonometric functions for angle θ. Rationalize the denominators, if needed.

3. The central angle for the subtended arc of the circle $x^2 + y^2 = 144$ is 225°. Find the following:

(a) The sine and cosine of the angle

(b) The length of the arc, in radians

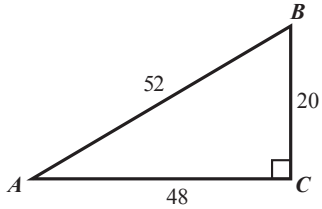
4. For each of the following, sketch the graph of the function. Use appropriate scales for axes:

(a) $y = 2 \sin (x - \frac{\pi}{3})$

(b) $y = 4 - \tan \frac{2x}{3}$

(c) $y = -2 \cos (3x + \pi)$

5. Prove each of the following identities, then demonstrate that the identity holds true for the triangle shown below.

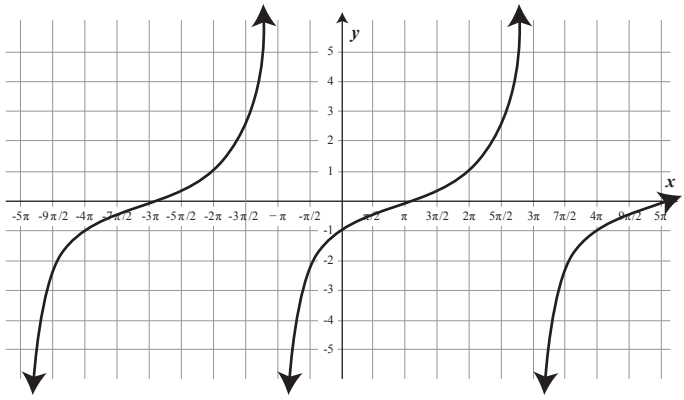


(a) $\sin \theta \times \sec \theta = \tan \theta$

(b) $\frac{\cos \theta}{\csc \theta} = \frac{\sin \theta}{\sec \theta}$

(c) $1 + \cot^2 \theta = \csc^2 \theta$

6. Write an equation that describes the trigonometric function graphed below.



7. Shane plays a note of A on his French horn. The sound wave he creates has a frequency of 440 hertz (cycles per second) and an amplitude of 0.5. Assuming a midline of the x-axis, what equation describes the sound wave Shane created?

8. Amy runs around a circular track near a three-story building. The closest Amy comes to the building while running is 6 meters, and this is her starting point. She runs at a steady pace, completing one lap, which is 402 meters long, every 80 seconds, for a total of 5 laps.

(a) Write and graph a trigonometric function that represents Amy's direct distance from the building as a function of time, in seconds.

(b) The building's shadow extends 90 meters from the base of the building, shading all of the track that is within this distance of the building. The remainder of the track is in direct sunlight. For approximately how many seconds out of each lap is Amy running in direct sunlight?