

10.6 Extra Practice

All

In Exercises 1–4, find the frequency of the function.

1. $y = \cos 3x$

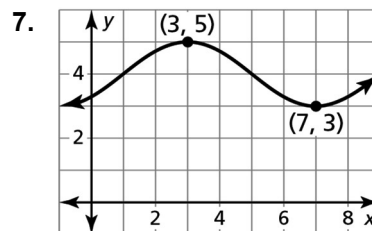
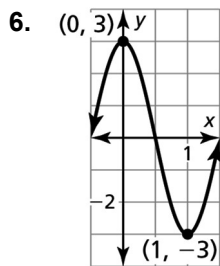
2. $y = -\cos 4x - 3$

3. $y = \sin \frac{\pi x}{2}$

4. $y = 4 \cos 0.4x - 3$

5. A sub-contra-octave A tuning fork (corresponds to the lowest note on a piano keyboard) vibrates with a frequency f of 27.5 hertz (cycles per second). You strike a sub-contra-octave A tuning fork with a force that produces a maximum pressure of 4 Pascals. Write and graph a sine model that gives the pressure P as a function of the time t (in seconds).

In Exercises 6 and 7, write a function for the sinusoid.



8. When you ride a Ferris wheel, your distance from the ground will vary with respect to the number of seconds that have elapsed since the wheel started. The table shows your height h (in meters) above the ground at time t as you ride the Ferris wheel.

t	0	1	2	3	4	5	6	7	8	9	10	11	12	15	20
h	1	2.3	5.8	10.2	13.7	15	13.7	10.2	5.8	2.3	1	2.3	5.8	15	1

- Use sinusoidal regression to find a model that gives h as a function of t .
- Predict your height above the ground after 42 seconds have elapsed.

10.7 Extra Practice**Odds****In Exercises 1–6, find the values of the other five trigonometric functions of θ .**

1. $\sin \theta = \frac{3}{8}, \frac{\pi}{2} < \theta < \pi$

2. $\cos \theta = -\frac{1}{3}, \pi < \theta < \frac{3\pi}{2}$

3. $\tan \theta = 3, 0 < \theta < \frac{\pi}{2}$

4. $\cot \theta = \frac{10}{3}, \pi < \theta < \frac{3\pi}{2}$

5. $\sec \theta = -\frac{9}{5}, \frac{\pi}{2} < \theta < \pi$

6. $\csc \theta = -\frac{7}{2}, \frac{3\pi}{2} < \theta < 2\pi$

In Exercises 7–12, simplify the expression.

7. $\sin x(\cot^2 x + 1)$

8. $\frac{\cot(-\theta)}{\cos(-\theta)}$

9. $\cos\left(\frac{\pi}{2} - \theta\right) \cot \theta$

10. $\frac{\tan^2 \theta - \sec^2 \theta}{\cos\left(\frac{\pi}{2} - \theta\right) \sec \theta}$

11. $\frac{\sin(-x)}{\tan(-x) \sec x} + \sin^2 x$

12. $\frac{\csc^2 x - \tan x \cot x}{\csc x - 1}$

13. Describe and correct the error in simplifying the expression.

$$\begin{aligned}
 \times \quad \csc \theta \cot \theta \cos \theta &= \frac{1}{\cos \theta} \cdot \frac{\cos \theta}{\sin \theta} \cdot \cos \theta \\
 &= \frac{\cos \theta}{\sin \theta} \\
 &= \cot \theta
 \end{aligned}$$

In Exercises 14–17, verify the identity.

14. $\tan\left(\frac{\pi}{2} - x\right) \cos^2\left(\frac{\pi}{2} - x\right) = \cos x \sin x$

15. $\frac{1 + \sin(-x)}{\cos x \tan x - 1} = -1$

16. $\frac{1 - \cos x}{\sin x} = \csc x - \cot x$

17. $\frac{1 + \sin \theta}{\cos \theta} + \frac{\cos \theta}{1 - \sin \theta} = 2 \sec \theta + 2 \tan \theta$

18. Use the sine and cosine functions to verify the identity $\tan x \cot x = 1$.