

4-6 Lesson Master

Questions on SPUR Objectives
See Student Edition pages 288–291 for objectives.

PROPERTIES Objective C

1. Describe the values of θ between 0 and 2π which satisfy $0 \leq \tan \theta \leq 1$.

2. Describe the values of θ between 0 and 2π with $\tan \theta < 0$ and $\cos \theta < 0$.

PROPERTIES Objective D

In 3-5, use the Periodicity Theorem to evaluate.

3. $\tan 2850^\circ$ _____ 4. $\sin 2070^\circ$ _____ 5. $\cos 495^\circ$ _____

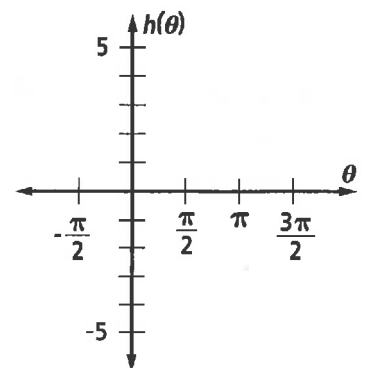
In 6-8, use the Periodicity Theorem and the fact that $\tan \frac{4\pi}{7} \approx -4.381$ to evaluate.

6. $\tan \frac{13\pi}{7}$ _____ 7. $\tan -\frac{5\pi}{7}$ _____ 8. $\tan \frac{22\pi}{7}$ _____

REPRESENTATIONS Objective I

9. Consider $h(\theta) = \tan \theta$.

- a. Sketch a graph of $h(\theta)$ for $-\frac{\pi}{2} < \theta < \frac{3\pi}{2}$.
- b. Label the y-intercept and zeros of h .
- c. Identify the period of h . _____
- d. Give the domain of h . _____
- e. Give the range of h . _____
- f. Tell whether h is an odd function, an even function, or neither. Justify your answer.



4-7 Lesson Master

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PROPERTIES Objective E

In 1 and 2, an equation for a function is given. a. State the period of the function. b. State the amplitude of the function.

1. $3y = \sin\left(\frac{x}{2}\right)$ a. _____ b. _____

2. $\frac{y}{8} = \frac{\sin x}{6}$ a. _____ b. _____

3. $y = 5 \cos(3\pi x)$ a. _____ b. _____

4. Consider the image of the graph of $y = \cos x$ under the transformation $S(x, y) = \left(5x, \frac{y}{4}\right)$.

a. Find the amplitude of the image. _____

b. Find the period of the image. _____

c. Find an equation for the image. _____

USES Objective F

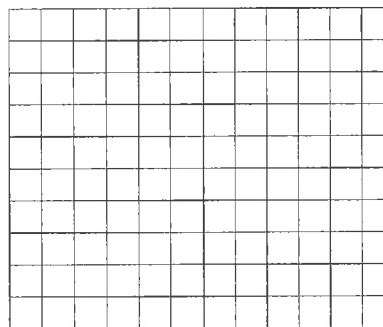
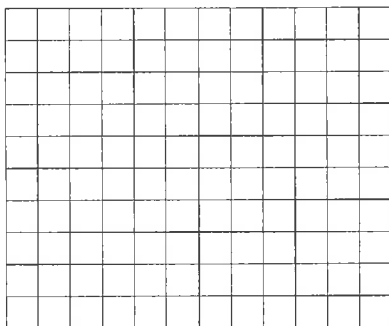
5. Suppose a tuning fork vibrates with a frequency of approximately 370 cycles per second. If the vibration displaces air molecules by a maximum of 0.22 mm, give a possible equation for the sound wave that is produced. _____

6. A certain sound wave has equation $y = 17 \cos(120\pi t)$. Write an equation of a sound wave with pitch one octave lower and three times as loud as this one. _____**REPRESENTATIONS** Objective J

In 7 and 8, sketch one cycle of the graph without a graphing utility.

7. $y = \frac{\cos\left(\frac{2x}{3}\right)}{4}$

8. $y = 3 \sin\left(\frac{\pi}{7}x\right)$



4-8 Lesson Master

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PROPERTIES Objective E

1. Consider the function $f(x) = \cos\left(x - \frac{7\pi}{3}\right) - 2$. Find each of the following for f .
- the phase shift from the cosine function _____
 - the period _____
 - the amplitude _____
 - the maximum and minimum values _____

USES Objective F

2. For an electrical-power supply, the output potential (in volts) and the current (in amps) as a function of time (in seconds) are given by

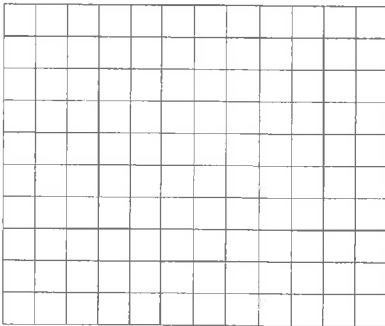
$$V = 30 \cos t + 20 \text{ and } I = 0.25 \cos\left(t - \frac{5\pi}{4}\right).$$

- What are the maximum and minimum output voltages? _____
- What are the maximum and minimum outputs of the currents? _____
- What is the phase shift between output current and output voltage? _____
- By how many seconds does the maximum current lag behind the maximum voltage? _____

REPRESENTATIONS Objective J

In 4 and 5, sketch a graph of the function.

3. $f(x) = \sin\left(2x + \frac{\pi}{3}\right) + 1$



4. $y - 3 = \tan\left(x - \frac{\pi}{4}\right)$

