Name

LESSON MASTER 5-1

Questions on SPUR Objectives
See pages 364–367 for objectives.

Skills Objective A

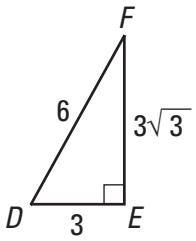
In 1–4, refer to $\triangle DEF$ at the right. Find each.

1. cos D _____

2. sin F _____

3. cos F _____

4. tan D _____



In 5–8, approximate to the nearest hundredth.

5. tan 11.1° _____

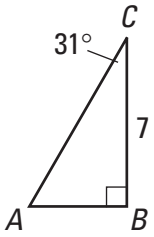
6. cos 165°12′ _____

7. sin $\frac{8\pi}{7}$ _____

8. cos $\frac{3\pi}{8}$ _____

Skills Objective C

9. Refer to $\triangle ABC$. Find AC and AB to the nearest hundredth.



$AC =$ _____

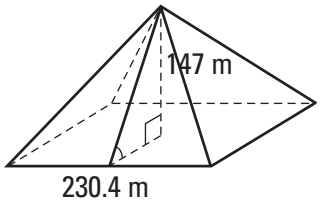
$AB =$ _____

10. Find the measure of $\angle D$ in $\triangle DEF$ above. _____

Uses Objective G

11. The largest of the ancient Egyptian pyramids, built for the king Khufu, is a regular square pyramid with base edges of length 230.4 m and a height of 147 m. What angle do the faces of the pyramid make with the ground?

_____



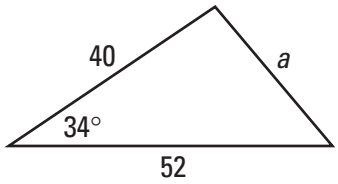
Name

LESSON MASTER 5-2

Questions on SPUR Objectives
See pages 364–367 for objectives.

Skills Objective C

1. Refer to $\triangle ABC$ at the right. Find a to the nearest tenth.

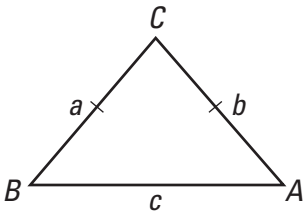


In 2 and 3, consider $\triangle DEF$ where $DE = 38$, $EF = 48$, and $DE = 70$. Find the measure of the given angle to the nearest tenth of a degree.

2. $\angle D$ _____ **3.** $\angle F$ _____

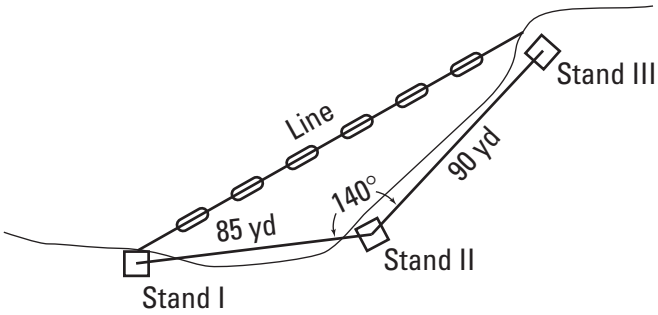
Properties Objective E

4. Use the Law of Cosines to show that for isosceles $\triangle ABC$ pictured at the right $c = a\sqrt{2 - 2\cos C}$.



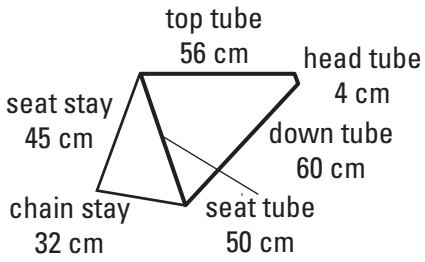
Uses Objective H

5. Three lifeguard stands are positioned as shown in the diagram below. The lifeguards would like to have a buoyant line that would run from stand I to stand III for nonswimmers. Approximately how long would the line have to be? _____



6. At the right is pictured a typical bicycle "diamond" frame, with dimensions given in centimeters. What is the angle between the seat stay and the chain stay?

_____



Name

LESSON MASTER 5-3

Questions on SPUR Objectives
See pages 364–367 for objectives.

Skills Objective B

In 1–3, evaluate without a calculator. Give an exact answer in radians.

1. $\cos^{-1}\left(\frac{1}{2}\right)$ _____

2. $\text{Arccos}\left(-\frac{1}{2}\right)$ _____

3. $\cos^{-1} 1$ _____

In 4–6, use a calculator to approximate to the nearest hundredth of a degree.

4. $\cos^{-1}(-0.38)$ _____

5. $\cos^{-1}\left(\frac{1}{9}\right)$ _____

6. $\text{Arccos } 0.999$ _____

Skills Objective D

In 7 and 8, find θ, where $0 \leq \theta \leq \pi$, to the nearest hundredth.

7. $\cos \theta = 0.5$ _____

8. $2\cos \theta = 0.5$ _____

Properties Objective F

In 9 and 10, the equation for a function is given.
a. State its domain. b. State its range.

9. $f(x) = \cos^{-1} x$

a. _____

b. _____

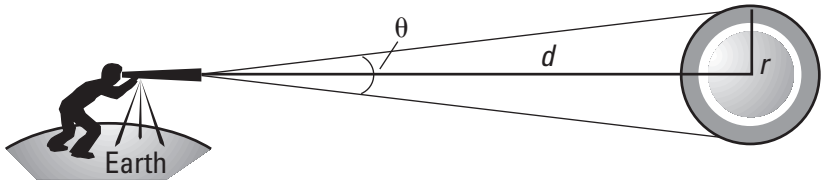
10. $g(t) = 3\cos^{-1} t$

a. _____

b. _____

Uses Objective I

11. As viewed from Earth, any distant astronomical object subtends some angle θ, which depends on the object's radius *r* and its distance *d* from Earth.



a. Use the inverse cosine function to write a formula for θ in terms of *r* and *d*. _____

▶

b. The sun has a radius of 432,000 miles and is an average of 92,900,000 miles from Earth. What angle, in minutes, does the sun subtend in the sky? _____

c. The moon has a radius of 1,080 miles and its center is an average of 235,000 miles from Earth's surface. At this distance, what angle (in minutes) does the moon subtend in the sky? _____

d. The center of the moon ranges from 217,500 to 248,700 miles from Earth's surface in its elliptical orbit. Explain why when it is farthest from Earth there cannot be a total eclipse of the sun.

_____

_____

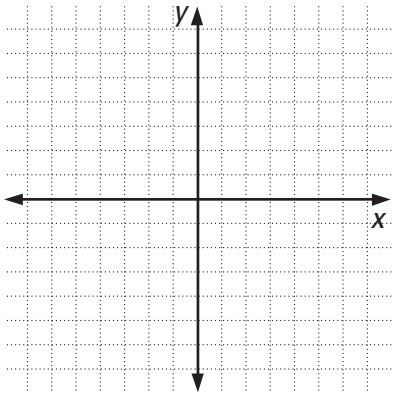
_____

_____

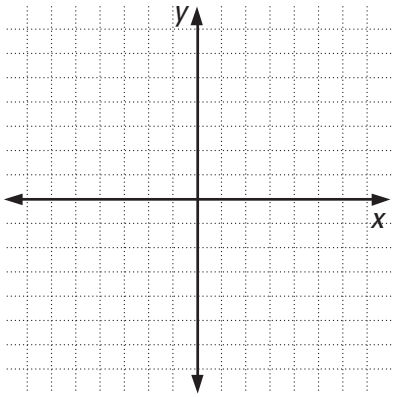
Representations Objective J

In 12 and 13, graph the function on the given set of axes.

12. $f(x) = \cos^{-1} x$



13. $f(x) = \sin^{-1} x$



14. *True or false.* The graph of the inverse cosine function is symmetric to the origin. _____

Name

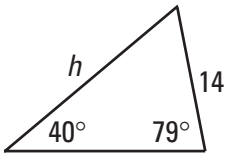
LESSON MASTER 5-4

Questions on SPUR Objectives
See pages 364–367 for objectives.

Skills Objective C

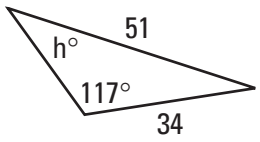
In 1 and 2, use the Law of Sines to find *h*.

1.



_____

2.



_____

In 3 and 4, consider $\triangle ABC$ where $m\angle A = 24°$, $m\angle B = 99°$, and $c = 3.1$.

3. Find the lengths of sides a and b. _____

4. Find the area of $\triangle ABC$. _____

Properties Objective E

5. List three conditions for which the Law of Sines yields a unique solution.

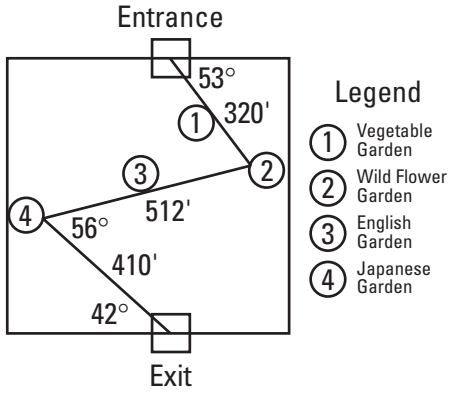
_____

6. In $\triangle PRL$, $PR = 3RL$. Find $\frac{\sin L}{\sin P}$. _____

Uses Objective H

7. Suppose a botanical garden is laid out in a large square plot as shown at the right. The path through the garden enters and exits exactly in the middle of opposite sides. What are the dimensions of the garden? Round your answer to the nearest foot.

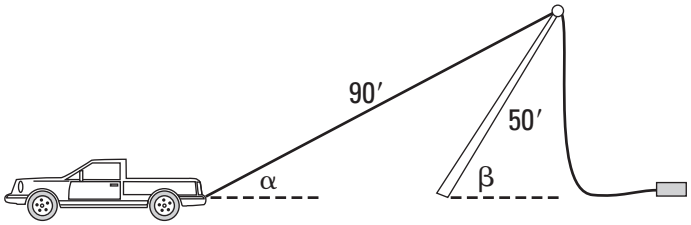
_____



Uses Objective I

8. A 50-foot flagpole is lifted into place with a 90-foot rope as shown. Write an equation that relates $\angle\alpha$ (the angle between the rope and the ground) to $\angle\beta$ (the angle between the pole and the ground).

_____



Name

LESSON MASTER 5-5

Questions on SPUR Objectives
See pages 364–367 for objectives.

Skills Objective B

In 1–3, evaluate without a calculator. Give an exact answer in radians.

1. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$ _____ **2.** $\text{Arcsin}\left(\frac{\sqrt{2}}{2}\right)$ _____ **3.** $\sin^{-1}(-1)$ _____

In 4–6, use a calculator to approximate to the nearest hundredth of a degree.

4. $\sin^{-1}\left(\frac{3}{4}\right)$ _____

5. $\sin^{-1}\left(-\frac{1}{9}\right)$ _____

6. Arcsin 0.81329 _____

Skills Objective D

In 7 and 8, find θ, where $-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$, to the nearest hundredth.

7. $3 \sin \theta = 2$ _____

8. $\sin\left(\frac{1}{2}\pi\theta\right) = -0.3120$ _____

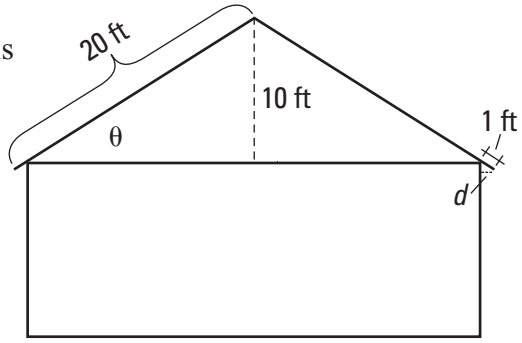
Properties Objective F

9. *True or false.* The inverse sine and inverse cosine functions have the same domain. _____

10. *True or false.* $\sin^{-1}\left(\sin \frac{3\pi}{4}\right) = \frac{3\pi}{4}$ _____

Uses Objective I

11. a. A contractor building a house wishes to calculate the pitch θ of the roof. The contractor knows that the roof is 20 feet long with a 1-foot overhang and a height of 10 feet. Find θ.



_____

b. The contractor wants to place a window on the side of the house but does not want the overhang to cover the window. What is the shortest distance *d* that the top of the window can be to the roof? _____

Representations Objective J

12. *True or false.* The graph of the inverse sine function is point symmetric to the origin. _____

Name

LESSON MASTER **5-6**

Questions on SPUR Objectives
See pages 364–367 for objectives.

Skills Objective B

In 1–3, evaluate without a calculator. Give an exact answer in radians.

1. Arctan $\sqrt{3}$ _____ **2.** $\tan^{-1}\left(\frac{\sqrt{3}}{3}\right)$ _____ **3.** $\tan^{-1}\left(\tan\left(\frac{7\pi}{4}\right)\right)$ _____

In 4–6, use a calculator to approximate to the nearest hundredth of a degree.

4. $\tan^{-1}(-0.35)$ _____ **5.** $\tan^{-1} 50$ _____ **6.** Arctan 500 _____

Skills Objective D

In 7 and 8, $-90° < \theta < 90°$. Find θ to the nearest hundredth.

7. $\tan\theta = -5$ _____ **8.** $\frac{1}{2}\tan(5\theta) = 3$ _____

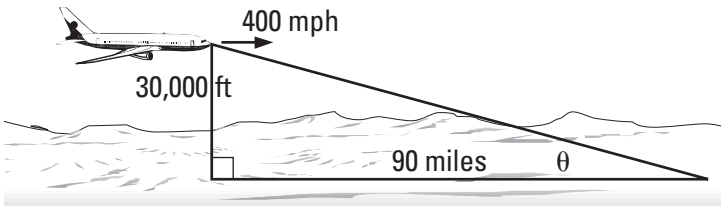
Properties Objective F

9. What is the domain of the inverse tangent function? _____

10. *True or false.* The inverse sine and inverse tangent functions have the same range. _____

Uses Objective I

11. An airplane at a level altitude of 30,000 ft is flying at a velocity of 400 mi/hr due east. At time $t = 0$, the plane is 90 miles due west of an observer on the ground. Write a formula using the inverse tangent function that gives the airplane's angle of inclination θ relative to the observer as a function of the time t in minutes. Remember 1 mile = 5280 feet. _____



Representations Objective J

12. *True or false.* The graph of the inverse tangent function is symmetric to the y-axis. _____

13. State equations for the asymptotes of the graph of the inverse tangent function. _____

Name

LESSON MASTER 5-7

Questions on SPUR Objectives
See pages 364–367 for objectives.

Skills Objective D

In 1–3, solve, given that $0° \le \theta \le 360°$. Give your solution(s) to the nearest hundredth of a degree.

1. $\cos \theta - 0.15 = 0$ _____

2. $4 \sin \theta = \frac{1}{2}$ _____

3. $3 \sin \theta + 2 = -0.5$ _____

In 4 and 5, find the least positive solution in radians.

4. $\frac{1}{\sin \theta} = \frac{7}{6}$ _____

5. $\tan^2 \theta = -\tan \theta + 6$ _____

In 6–8, describe the general solution in radians.

6. $0.2 \cos\left(\frac{1}{2}\theta\right) + 0.2 = 0.4$

_____

7. $\sin(5\theta) = 0.75$

_____

8. $9 \cos^2\theta - 12 \cos \theta + 4 = 0$

_____

In 9 and 10, describe the general solution in degrees.

9. $6 \tan(\pi\theta) = 36$ _____

10. $\sin^2\theta - \cos^2\theta = 0$ _____

Uses Objective I

11. Suppose a surface wave oscillates according to the equation $h = 1.3 \cos\left(\frac{\pi}{6}(t - 4)\right)$, where h is the height of the wave in meters and t is the time in seconds.

a. Solve this equation for t. _____

b. Find the first two times when the height of the wave is 1 m. _____

c. What is the period of the wave? _____

d. Find the general solution for when the height of the wave is 1 m. _____

_____