

Let θ be an angle in standard position. Name the quadrant in which the angle θ lies.

- | | | | | |
|--|-----------------|-----------------|-----------------|----------------|
| 1) $\tan \theta > 0, \sin \theta < 0$ | A) Quadrant IV | B) Quadrant II | C) Quadrant III | D) Quadrant I |
| 2) $\cos \theta < 0, \csc \theta < 0$ | A) Quadrant II | B) Quadrant III | C) Quadrant IV | D) Quadrant I |
| 3) $\sin \theta > 0, \cos \theta < 0$ | A) Quadrant I | B) Quadrant III | C) Quadrant IV | D) Quadrant II |
| 4) $\cot \theta < 0, \cos \theta > 0$ | A) Quadrant III | B) Quadrant II | C) Quadrant I | D) Quadrant IV |
| 5) $\csc \theta > 0, \sec \theta > 0$ | A) Quadrant II | B) Quadrant IV | C) Quadrant III | D) Quadrant I |
| 6) $\sec \theta < 0, \tan \theta < 0$ | A) Quadrant I | B) Quadrant III | C) Quadrant II | D) Quadrant IV |
| 7) $\tan \theta < 0, \sin \theta < 0$ | A) Quadrant III | B) Quadrant I | C) Quadrant II | D) Quadrant IV |
| 8) $\cos \theta > 0, \csc \theta < 0$ | A) Quadrant I | B) Quadrant III | C) Quadrant II | D) Quadrant IV |
| 9) $\cot \theta > 0, \sin \theta < 0$ | A) Quadrant I | B) Quadrant III | C) Quadrant II | D) Quadrant IV |
| 10) $\sin \theta > 0, \cos \theta > 0$ | A) Quadrant III | B) Quadrant II | C) Quadrant I | D) Quadrant IV |

2
Find the reference angle for the given angle.

1) 42°

A) 138°

B) 42°

C) 48°

D) 132°

2) 196.5°

A) 163.5°

B) 16.5°

C) 106.5°

D) 73.5°

3) -1.9°

A) 88.6°

B) 88.1°

C) 2.4°

D) 1.9°

4) 394°

A) 56°

B) 34°

C) 146°

D) 124°

5) -412°

A) 128°

B) 52°

C) 38°

D) 142°

6) $\frac{\pi}{5}$

A) $\frac{3\pi}{5}$

B) $\frac{\pi}{5}$

C) $\frac{7\pi}{5}$

D) $-\frac{\pi}{5}$

7) $\frac{5\pi}{7}$

A) $\frac{2\pi}{7}$

B) $\frac{5\pi}{7}$

C) $-\frac{5\pi}{7}$

D) $\frac{9\pi}{7}$

8) $\frac{5\pi}{7}$

A) $\frac{5\pi}{7}$

B) $\frac{2\pi}{7}$

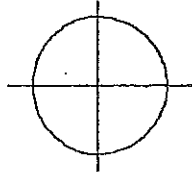
C) $\frac{9\pi}{7}$

D) $-\frac{5\pi}{7}$

Practice with Sines, Cosines, and Tangents

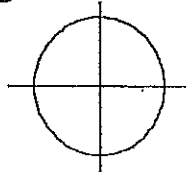
STATE THE ORDERED PAIR AT EACH VALUE OF θ . THEN NAME THE QUADRANT IN WHICH THE ORDERED PAIR FALLS. SKETCH θ ON A COORDINATE PLANE.

1. $\theta = 1$ radian



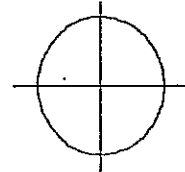
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2. $\theta = 12$ degrees



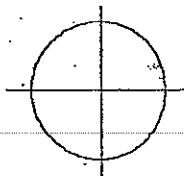
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3. $\theta = \frac{5\pi}{4}$ radians



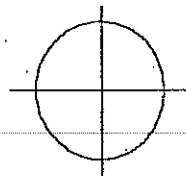
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4. $\theta = -330$ degrees



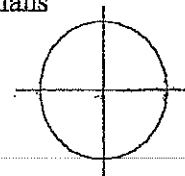
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5. $\theta = 270$ degrees



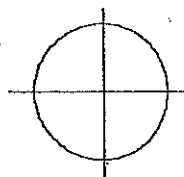
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6. $\theta = 2.3$ radians



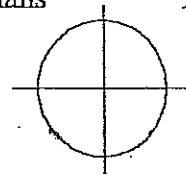
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7. $\theta = 181$ degrees



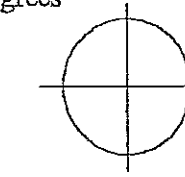
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8. $\theta = 4.2$ radians



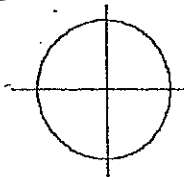
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9. $\theta = 312$ degrees



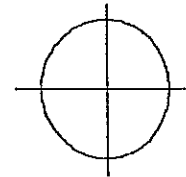
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10. $\theta = 97$ degrees



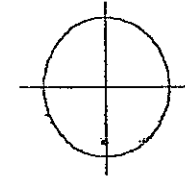
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11. $\theta = -24$ degrees



(_____ , _____)

12. $\theta = 6$ radians

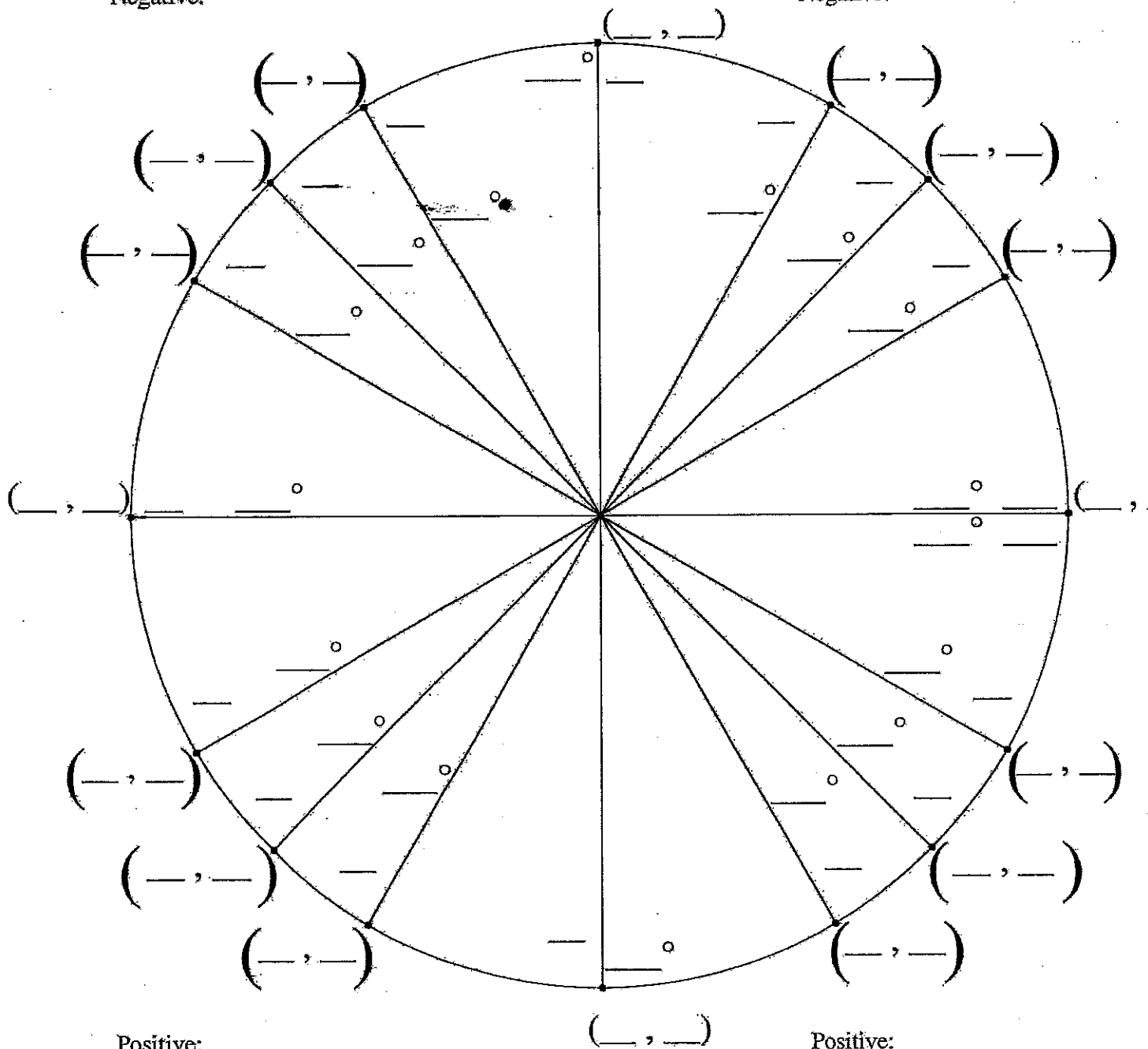


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Fill in The Unit Circle

Positive:
Negative:

Positive:
Negative:



Positive:
Negative:

Positive:
Negative:

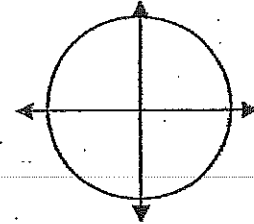
1. For the given coordinates, identify sine, cosine, and tangent of angle θ .

Coordinates on Unit Circle	Sin θ	Cos θ	Tan θ
a. (0.351, 0.936)			
b. (0.905, -0.425)			
c. (-0.5, 0.866)			

2. What is the mnemonic that tells you the quadrants with positive trig values?

3. Complete the following table to identify the trig value signs in each quadrant (don't use your notes):

Quadrant	Sin θ	Cos θ	Tan θ
First			
Second			
Third			
Fourth			



4. Without using a calculator, give the sign of the following. (hint: use the unit circle above to help you)

a. $\cos \frac{5\pi}{3}$

b. $\sin \frac{5\pi}{3}$

c. $\tan \frac{5\pi}{3}$

d. $\cos \frac{-7\pi}{3}$

e. $\sin \frac{\pi}{4}$

f. $\tan \frac{-4\pi}{6}$

5. Find the coordinates (x, y) for the image of the following rotations about the origin from $(1, 0)$ to three decimal places.

a. $\frac{2\pi}{5}$

b. $\frac{-2\pi}{5}$

c. $\frac{-15\pi}{10}$

d. $\frac{13\pi}{15}$

6. A large clock with rotating hour and minute hands is on a building with its center 40 feet from the ground. The length of the minute hand is 2.5 feet.

a. At 8:05, give the height off the ground of the tip of the minute hand.

b. At 8:40, give the height off the ground of the tip of the minute hand.

6.

Practice Worksheet – Exact Values of Sine, Cosine, and Tangent

DETERMINE THE EXACT VALUE OF EACH OF THE GIVEN EXPRESSIONS:

1. $\cos \frac{\pi}{6}$

2. $\sin \frac{\pi}{4}$

3. $\tan \frac{\pi}{3}$

4. $\sin \frac{\pi}{2}$

5. $\tan \pi$

6. $\cos \frac{2\pi}{3}$

7. $\cos 0$

8. $\tan \frac{3\pi}{2}$

9. $\sin \frac{5\pi}{4}$

10. $\sin \frac{5\pi}{3}$

11. $\tan \frac{11\pi}{6}$

12. $\sin 0$

13. $\cos \frac{7\pi}{4}$

14. $\cos \left(\frac{-3\pi}{2} \right)$

15. $\tan \left(\frac{-3\pi}{4} \right)$

16. $\sin \frac{17\pi}{6}$

17. $\cos \frac{11\pi}{3}$

18. $\tan 100\pi$

19. $\sin \left(\frac{-\pi}{6} \right)$

20. $\cos \left(\frac{-2\pi}{3} \right)$

21. $\tan \left(\frac{-9\pi}{2} \right)$

7

FIND ALL VALUES OF θ SUCH THAT $0 \leq \theta \leq 2\pi$ THAT MAKE EACH OF THE FOLLOWING GIVEN STATEMENTS TRUE:

22. $\sin \theta = \frac{\sqrt{2}}{2}$

23. $\cos \theta = \frac{\sqrt{3}}{2}$

24. $\tan \theta = 1$

25. $\cos \theta = 0$

26. $\tan \theta = \sqrt{3}$

27. $\sin \theta = -1$

28. $\tan \theta = \frac{-\sqrt{3}}{3}$

29. $\sin \theta = 0$

30. $\cos \theta = -1$

31. $\sin \theta = \frac{-\sqrt{3}}{2}$

32. $\cos \theta = \frac{-\sqrt{2}}{2}$

33. $\tan \theta$ is undefined

34. $\tan \theta = -1$

35. $\sin \theta = \frac{\sqrt{3}}{2}$

36. $\cos \theta = \frac{-1}{2}$

8 Six Trig Functions WS

1) $\sin 30^\circ$

A) $\frac{2\sqrt{3}}{3}$

B) $\frac{1}{2}$

C) $\frac{\sqrt{3}}{2}$

D) $\sqrt{3}$

2) $\cot 30^\circ$

A) $\frac{2\sqrt{3}}{3}$

B) $\sqrt{3}$

C) $\frac{\sqrt{3}}{2}$

D) $\frac{1}{2}$

3) $\cos 60^\circ$

A) $\frac{2\sqrt{3}}{3}$

B) $\sqrt{3}$

C) $\frac{\sqrt{3}}{2}$

D) $\frac{1}{2}$

4) $\csc 60^\circ$

A) $\frac{\sqrt{3}}{2}$

B) $\sqrt{3}$

C) $\frac{1}{2}$

D) $\frac{2\sqrt{3}}{3}$

5) $\tan 45^\circ$

A) $\frac{1}{2}$

B) 1

C) $\frac{\sqrt{2}}{2}$

D) $\sqrt{2}$

6) $\sec 45^\circ$

A) $\frac{\sqrt{2}}{2}$

B) $\sqrt{2}$

C) $\frac{1}{2}$

D) 1

7) $\sec 60^\circ - \sin 60^\circ$

A) $\frac{4-\sqrt{3}}{2}$

B) $\frac{4-\sqrt{2}}{2}$

C) $\frac{4\sqrt{3}-3\sqrt{2}}{6}$

D) $\frac{-\sqrt{3}}{6}$

8) $\tan 30^\circ - \sin 45^\circ$

A) $\frac{2\sqrt{2}-3\sqrt{3}}{6}$

B) $\frac{2-\sqrt{3}}{2}$

C) $\frac{2\sqrt{3}-3\sqrt{2}}{6}$

D) $\frac{2-\sqrt{2}}{2}$

9) $\cos \frac{\pi}{6}$

A) $\frac{\sqrt{3}}{3}$

B) $\sqrt{3}$

C) $\frac{\sqrt{3}}{2}$

D) $\frac{1}{2}$

10) $\sin \frac{\pi}{3}$

A) $\sqrt{3}$

B) $\frac{\sqrt{3}}{3}$

C) $\frac{\sqrt{3}}{2}$

D) $\frac{1}{2}$

11) $\sec \frac{\pi}{6}$

A) 2

B) $2\sqrt{3}$

C) $\frac{1}{2}$

D) $\frac{2\sqrt{3}}{3}$

12) $\tan \frac{\pi}{3}$

A) $\frac{1}{2}$

B) $\sqrt{3}$

C) $\frac{\sqrt{3}}{2}$

D) $\frac{\sqrt{3}}{3}$

13) $\sin \frac{\pi}{4}$

A) $\frac{\sqrt{2}}{2}$

B) $\frac{1}{2}$

C) 1

D) $\sqrt{2}$

14) $\csc \frac{\pi}{4}$

A) 1

B) $\frac{\sqrt{2}}{2}$

C) $\sqrt{2}$

D) $\frac{1}{2}$

θ is an acute angle and $\sin \theta$ and $\cos \theta$ are given. Use identities to find the indicated value.

1) $\sin \theta = -\frac{2}{7}$, $\cos \theta = \frac{3\sqrt{5}}{7}$. Find $\csc \theta$.

A) $-\frac{2\sqrt{5}}{15}$

B) $\frac{7\sqrt{5}}{15}$

C) $-\frac{7}{2}$

D) $-\frac{3\sqrt{5}}{2}$

2) $\sin \theta = \frac{5}{7}$, $\cos \theta = \frac{2\sqrt{6}}{7}$. Find $\tan \theta$.

A) $\frac{5\sqrt{6}}{5}$

B) $\frac{5\sqrt{6}}{12}$

C) $\frac{7\sqrt{6}}{12}$

D) $\frac{7}{5}$

3) $\sin \theta = \frac{\sqrt{5}}{3}$, $\cos \theta = -\frac{2}{3}$. Find $\sec \theta$.

A) $\frac{3\sqrt{5}}{5}$

B) $-\frac{3}{2}$

C) $\frac{\sqrt{5}}{2}$

D) $-\frac{2\sqrt{5}}{5}$

4) $\sin \theta = -\frac{\sqrt{11}}{6}$, $\cos \theta = \frac{5}{6}$. Find $\cot \theta$.

A) $-\frac{5\sqrt{11}}{11}$

B) $\frac{\sqrt{11}}{5}$

C) $-\frac{6\sqrt{11}}{11}$

D) $\frac{6}{5}$

Write each measure in radians. Express your answer in terms of π

- 1. 45°
- 2. 90°
- 3. 30°
- 4. -150°
- 5. 180°
- 6. -240°
- 7. 270°
- 8. 300°

Write each measure in degrees. Round your answer to the nearest degree, if necessary.

- 9. $\frac{\pi}{6}$ radians
- 10. $-\frac{7\pi}{6}$ radians
- 11. $\frac{7\pi}{4}$ radians
- 12. -4 radians
- 13. 1.8 radians
- 14. 0.45 radians

The measure θ of an angle in standard position is given. Find the exact values of $\cos \theta$ and $\sin \theta$ for each angle measure.

- 15. $\frac{\pi}{6}$ ()
- 16. $\frac{\pi}{3}$ ()
- 17. $-\frac{3\pi}{4}$ ()
- 18. $\frac{7\pi}{4}$ ()
- 19. $\frac{11\pi}{6}$ ()
- 20. $-\frac{2\pi}{3}$ ()

Determine the quadrant or axis where the terminal side of each angle lies.

- 30. $\frac{\pi}{5}$
- 31. $-\frac{5\pi}{2}$
- 32. $\frac{5\pi}{3}$
- 33. $\frac{8\pi}{7}$

For each angle θ , find the values of $\cos \theta$ and $\sin \theta$.

- 49. 225° ()
- 50. -225° ()
- 51. -45° ()
- 52. 330° ()
- 53. -330° ()
- 54. 150° ()

Open-Ended Find a positive and a negative coterminal angle for the given angle.

- 55. 50° $\begin{matrix} + \\ - \end{matrix}$
- 56. -130° $\begin{matrix} + \\ - \end{matrix}$
- 57. -680° $\begin{matrix} + \\ - \end{matrix}$
- 58. 395° $\begin{matrix} + \\ - \end{matrix}$
- 59. -38° $\begin{matrix} + \\ - \end{matrix}$
- 60. -434° $\begin{matrix} + \\ - \end{matrix}$

Find each value without using a calculator. If the expression is undefined, write *undefined*.

- 1. $\csc(-\pi)$
- 2. $\cot \frac{2\pi}{3}$
- 3. $\sec\left(-\frac{11\pi}{6}\right)$
- 4. $\csc \frac{3\pi}{4}$
- 5. $\cot\left(-\frac{\pi}{2}\right)$
- 6. $\csc 3\pi$
- 7. $\sec \frac{\pi}{3}$
- 8. $\cot\left(-\frac{\pi}{6}\right)$

3

4

4

4

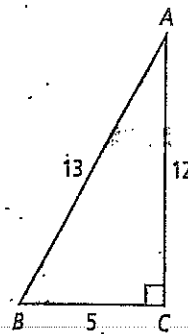
Find the values of the six trigonometric functions for the angle in standard position determined by each point.

- 1. $(-3, 4)$
- 2. $(12, -5)$
- 3. $(-2, -1)$
- 4. $(\sqrt{5}, 2)$

5. A hiker is standing on one bank of a river. A tree stands on the opposite bank, which is 750 ft away. A line from the top of the tree to the ground at the hiker's feet makes an angle of 12° with the ground. How tall is the tree?

6. In $\triangle ABC$, find each value as a fraction and as a decimal.

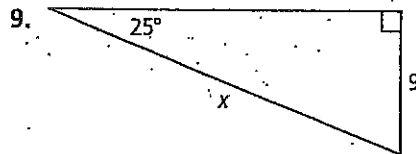
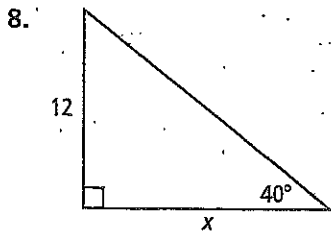
- a. $\cos A$
- b. $\csc A$
- c. $\tan B$
- d. $\sec B$
- e. $\cot A$
- f. $\csc B$



7. In $\triangle ABC$, $\angle C$ is a right angle and $\tan A = \frac{2}{3}$. Draw a diagram and find each value in fraction form:

- a. $\cos A$
- b. $\tan B$
- c. $\sin A$
- d. $\cot B$
- e. $\sec A$
- f. $\csc B$

Find each length x . Round to the nearest tenth.



10. A kite string makes a 62° angle with the horizontal, and 300 ft of string is let out. The string is held 6 ft off the ground. How high is the kite?

Sketch a right triangle with θ as the measure of one acute angle.

18. $\cos \theta = \frac{4}{11}$

19. $\sin \theta = \frac{7}{12}$

