Answers for 7.6

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7.6 Skill Practice

1. the opposite leg, the hypotenuse
2. The adjacent side is the side that forms part of the angle and is not opposite the right angle; the hypotenuse is the side opposite the right angle.
3. $\frac{4}{5}$ or 0.8, $\frac{3}{5}$ or 0.6
4. $\frac{35}{37}$ or 0.9459, $\frac{12}{37}$ or 0.3243
5. $\frac{28}{53}$ or 0.5283, $\frac{45}{53}$ or 0.8491
6. The ratio for sine is opposite over hypotenuse, not adjacent over hypotenuse; $\sin A = \frac{12}{13}$.
7. $\frac{3}{5}$ or 0.6, $\frac{4}{5}$ or 0.8
8. $\frac{15}{17}$ or 0.8824, $\frac{8}{17}$ or 0.4706
9. $\frac{1}{2}$ or 0.5, $\frac{\sqrt{3}}{2}$ or 0.8660
10. $x = 9.5, y = 15.3$
11. $a = 14.9, b = 11.1$
12. $v = 5.3, w = 1.7$
13. $r = 19.0, s = 17.7$
14. $p = 30.6, q = 14.9$
15. $m = 6.7, n = 10.4$
16. $\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}$
17. The triangle must be a right triangle, and you need either an acute angle measure and the length of one side or the lengths of two sides of the triangle.
18. C
19. 3.0
20. 13.8
21. 20.2

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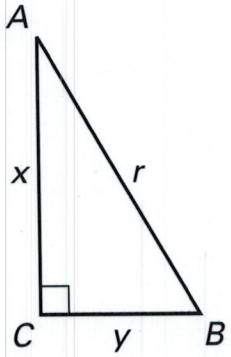
22. 7; $\frac{1}{2}$ or 0.5, $\frac{\sqrt{3}}{2}$ or 0.8660
23. 12; $\frac{2\sqrt{2}}{3}$ or 0.9428, $\frac{1}{3}$ or 0.3333
24. 37; $\frac{12}{37}$ or 0.3243, $\frac{35}{37}$ or 0.9459
25. 3; $\frac{\sqrt{5}}{5}$ or 0.4472, $\frac{2\sqrt{5}}{5}$ or 0.8944
26. 34; $\frac{8}{17}$ or 0.4706, $\frac{15}{17}$ or 0.8824
27. 33; $\frac{56}{65}$ or 0.8615, $\frac{33}{65}$ or 0.5077
28. *Sample answer:* You can use $\sin^{-1}$, $\cos^{-1}$, or $\tan^{-1}$ to determine the angle measure when you have the appropriate ratio.
29. D
30. about 14 cm
31. about 13 cm

32. a.



$$\sin A = \frac{y}{r} \rightarrow y = r \sin A$$

$$\cos A = \frac{x}{r} \rightarrow x = r \cos A$$

$$\tan A = \frac{y}{x} = \frac{\sin A}{\cos A}$$

b.

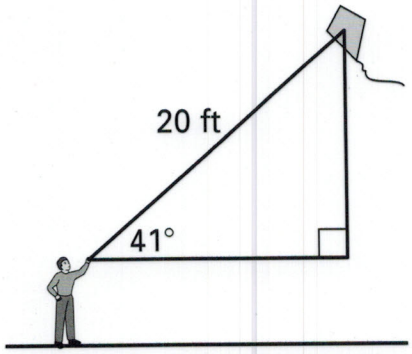
$$x^2 + y^2 = r^2$$
$$(r \cos A)^2 + (r \sin A)^2 = r^2$$
$$r^2 \cos^2 A + r^2 \sin^2 A = r^2$$
$$r^2(\cos^2 A + \sin^2 A) = r^2$$
$$\cos^2 A + \sin^2 A = 1$$

7.6 Problem Solving

33. about 36.9 ft

34. 16 ft

35. a.



b. About 18.1 ft; the height that the spool is off the ground has to be added.

36. a. about 35.7 ft

b. yes

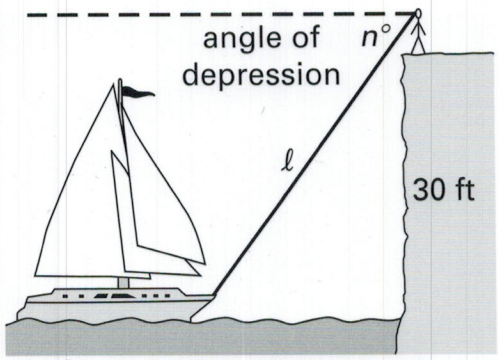
c. cosine

37. Both; since different angles are used in each ratio, both the sine and cosine relationships can be used to correctly answer the question.

38. yes

48. $3\sqrt{13}$, $2\sqrt{13}$

39. a.

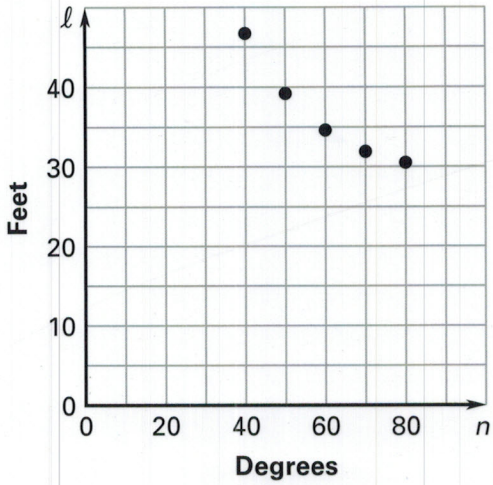


b.

***n* (degrees)**	40	50	60
ℓ (feet)	46.7	39.2	34.6

***n* (degrees)**	70	80
ℓ (feet)	31.9	30.5

c.



d. *Sample answer:* 60 ft

40. The Pythagorean Theorem tells us that $GT = \sqrt{3}$, so $\cos G = \frac{\sqrt{3}}{2}$. Since $\triangle EQU$ is equilateral, all angles must be 60°. To determine the height, drop an altitude from one angle down; this bisects the angle and you have a 30°-60°-90° triangle with $\sin E = \frac{\sqrt{3}}{2}$. Therefore $\sin E = \cos G$.

41. a.

θ	$\sin \theta$	$\cos \theta$
17°	0.2924	0.9563
30°	0.5	0.8660
34°	0.5592	0.8290
45°	0.7071	0.7071
56°	0.8290	0.5592
60°	0.8660	0.5
73°	0.9563	0.2924
90°	1	0

b. For complementary angles, the sine and cosine values are reversed, *i.e.* $\sin 30° = \cos 60°$.

c. If A and B are complementary, then $\sin A = \cos B$.

d. Check students' work.

Answers for 7.6 *continued*

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7.6 Mixed Review

42. $x = y^2, y > 0$

43. $x = \dfrac{y + 10}{3}$

44. $x = 9y$

45. 0; 1; 2; 4; 16

46. $1; 2; \frac{1}{3}; \frac{7}{2}; \frac{1}{7}$

47. $-14; -7; 7; 14; 21$

48. $3\sqrt{13}, 2\sqrt{13}$