Chapter 2, Introduction to Trigonometry

Focus Exercise Odd Answers

Section 2.1 Special Right Triangles

1. $a = \frac{9\sqrt{3}}{2}$
$c = 9$

3. $a = 4\sqrt{6}$
$c = 8\sqrt{2}$

5. $a = 6\sqrt{3}$
$b = 6$

7. $a = 15$
$b = 5\sqrt{3}$

9. $a = 9$
$c = 18$

11. $a = \sqrt{6}$
$c = 2\sqrt{6}$

13. $b = 5$
$c = 5\sqrt{2}$

15. $b = 4\sqrt{3}$
$c = 4\sqrt{6}$

17. $a = 6$
$b = 6$

19. $a = \frac{11\sqrt{2}}{2}$
$b = \frac{11\sqrt{2}}{2}$

21. $x = 8$
$p = 8\sqrt{2}$
$y = 4$
$h = 4\sqrt{3}$

23. $m = 10\sqrt{2}$
$x = 10\sqrt{2}$
$y = 5\sqrt{2}$
$h = 5\sqrt{6}$

25. $x = 6$
$h = 4\sqrt{3}$
$p = 4\sqrt{3}$
$y = 4\sqrt{6}$

27. $h = 3\sqrt{2}$
$p = 3\sqrt{2}$
$m = \frac{3\sqrt{2}}{2}$
$x = \frac{3\sqrt{6}}{2}$

29. $h = 6$
$m = 6\sqrt{2}$
$y = 2\sqrt{6}$
$x = 4\sqrt{6}$

31. $h = 6\sqrt{2}$
$p = 6\sqrt{2}$
$y = 4\sqrt{3}$
$x = 8\sqrt{3}$

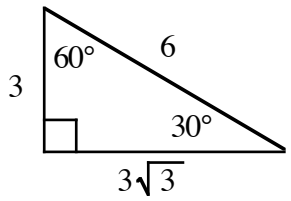
Section 2.2 Trigonometry: The Triangle Identities

1. $\sin A = \frac{2}{3}$ $\cos A = \frac{\sqrt{5}}{3}$ $\tan A = \frac{2\sqrt{5}}{5}$ $\cot A = \frac{\sqrt{5}}{2}$ $\sec A = \frac{3\sqrt{5}}{5}$ $\csc A = \frac{3}{2}$	**3.** $\sin B = \frac{\sqrt{5}}{3}$ $\cos B = \frac{2}{3}$ $\tan B = \frac{\sqrt{5}}{2}$ $\cot B = \frac{2\sqrt{5}}{5}$ $\sec B = \frac{3}{2}$ $\csc B = \frac{3\sqrt{5}}{5}$	**5.** $\sin A = \frac{\sqrt{3}}{3}$ $\cos A = \frac{\sqrt{6}}{3}$ $\tan A = \frac{\sqrt{2}}{2}$ $\cot A = \sqrt{2}$ $\sec A = \frac{\sqrt{6}}{2}$ $\csc A = \sqrt{3}$	**7.** $\sin B = \frac{\sqrt{6}}{3}$ $\cos B = \frac{\sqrt{3}}{3}$ $\tan B = \sqrt{2}$ $\cot B = \frac{\sqrt{2}}{2}$ $\sec B = \sqrt{3}$ $\csc B = \frac{\sqrt{6}}{2}$

9. No. In a right triangle, the sine ratio is $\frac{\text{opp}}{\text{hyp}}$ and the opposite side is always shorter than the hypotenuse, so sine will always be less than 1.

Section 2.3 Trigonometry of Special Right Triangles

1.



$\sin 60° = \frac{\sqrt{3}}{2}$ $\qquad$ $\sin 30° = \frac{1}{2}$

$\cos 60° = \frac{1}{2}$ $\qquad$ $\cos 30° = \frac{\sqrt{3}}{2}$

$\tan 60° = \sqrt{3}$ $\qquad$ $\tan 30° = \frac{\sqrt{3}}{3}$

$\cot 60° = \frac{\sqrt{3}}{3}$ $\qquad$ $\cot 30° = \sqrt{3}$

$\sec 60° = 2$ $\qquad$ $\sec 30° = \frac{2\sqrt{3}}{3}$

$\csc 60° = \frac{2\sqrt{3}}{3}$ $\qquad$ $\csc 30° = 2$

3. In a 45-45-90 triangle, the adjacent side and the opposite side are the same, so

$$(3) \quad \sin(45°) = \frac{\text{opp}}{\text{hyp}} = \frac{\text{adj}}{\text{hyp}} = \cos(45°)$$

5. 1 $\qquad$ **7.** -5 $\qquad$ **9.** 1 $\qquad$ **11.** $\frac{\sqrt{2}}{2}$

13. $\frac{1}{2}$ $\qquad$ **15.** $\frac{1}{3}$

Section 2.4 Points in the *x*-*y*-Plane

1. Quad III and IV

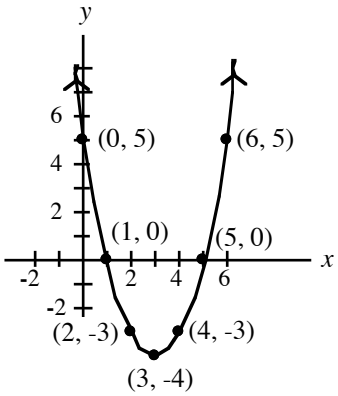
3. Quad II and IV

5. Quad II and III

7. Quad I and III

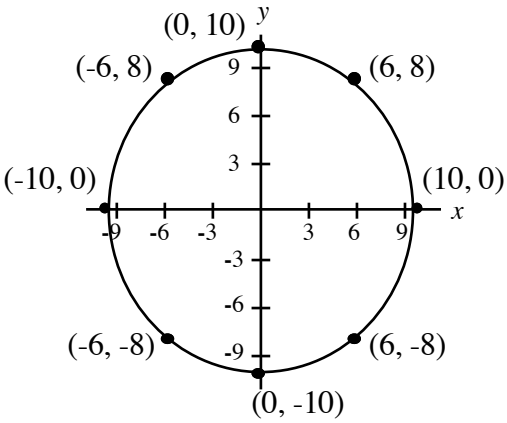
9.

x	y
0	5
1	0
2	-3
3	-4
4	-3
5	0
6	5



15. a) $r = 10$

c) $x^2 + y^2 = 100$



11. $d = 5$

13. $d = 5\sqrt{5}$

#17 & 19 are started but left incomplete here.

17. $\left(\frac{3}{5}\right)^2 + \left(-\frac{4}{5}\right)^2 \stackrel{?}{=} 1$

19. $\left(-\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2 \stackrel{?}{=} 1$

Section 2.5 Trigonometry in the *x-y*-Plane

For #1-5, the plotting of the point in the *x-y*-plane is not shown.

1. $r = 2\sqrt{10}$ $\sin\theta = \frac{3\sqrt{10}}{10}$ $\cos\theta = \frac{\sqrt{10}}{10}$ $\tan\theta = 3$ $\cot\theta = \frac{1}{3}$ $\sec\theta = \sqrt{10}$ $\csc\theta = \frac{\sqrt{10}}{3}$	**3.** $r = 5$ $\sin\theta = -1$ $\cos\theta = 0$ $\tan\theta$ is undefined $\cot\theta = 0$ $\sec\theta$ is undefined $\csc\theta = -1$	**5.** $r = 4$ $\sin\theta = \frac{-3}{4}$ $\cos\theta = \frac{-\sqrt{7}}{4}$ $\tan\theta = \frac{3\sqrt{7}}{7}$ $\cot\theta = \frac{\sqrt{7}}{3}$ $\sec\theta = \frac{-4\sqrt{7}}{7}$ $\csc\theta = \frac{-4}{3}$

7. 70° **9.** 25° **11.** 20° **13.** 35°

15. Quad II **17.** Quad II **19.** Quad I **21.** Quad II

23. $\sin\theta = \frac{3}{5}$ $\cos\theta = \frac{-4}{5}$ $\tan\theta = \frac{-3}{4}$	**25.** $\sin\theta = \frac{-\sqrt{11}}{6}$ $\cos\theta = \frac{-5}{6}$ $\tan\theta = \frac{\sqrt{11}}{5}$	**27.** $\sin\theta = \frac{-3\sqrt{10}}{10}$ $\cos\theta = \frac{-\sqrt{10}}{10}$ $\tan\theta = 3$

29. $\sin\theta = \frac{-\sqrt{15}}{4}$ $\cos\theta = \frac{1}{4}$ $\tan\theta = -\sqrt{15}$	**31.** No. In the *x-y*-plane, the sine ratio is $\frac{y}{r}$ and the *y*-value is never more than the radius, *r*, so sine will never be more than 1.

Section 2.6 Trigonometric Identities

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

3. $\frac{\sqrt{7}}{2}$

5. $-\sqrt{3}$

7. $\frac{3\sqrt{2}}{8}$

9. Undefined

11. $\frac{4}{25}$

13. $\frac{2}{3}$

15. $\frac{25}{18}$

17. $\tan\theta = \frac{24}{7}$; $\cot\theta = \frac{7}{24}$

19. $\tan\theta = \sqrt{15}$; $\cot\theta = \frac{\sqrt{15}}{15}$

21. $\tan\theta$ is undefined; $\cot\theta = 0$

23. $\sin\theta = \frac{4}{5}$

25. $\sin\theta = \frac{1}{2}$