

Chapter 2, Introduction to Trigonometry

ODD Focus Exercise Answers

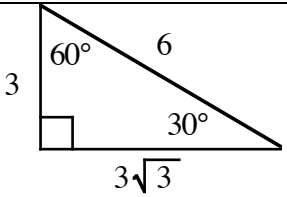
Section 2.1 Special Right Triangles

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|--|--|--|
| <p>1. a) $a = 5\sqrt{3}$
$c = 10$</p> | <p>b) $a = \frac{9\sqrt{3}}{2}$
$c = 9$</p> | <p>c) $a = 21$
$c = 14\sqrt{3}$</p> |
| <p>3. a) $b = 10$
$c = 20$</p> | <p>b) $b = 4\sqrt{3}$
$c = 8\sqrt{3}$</p> | <p>c) $b = \frac{5\sqrt{3}}{3}$
$c = \frac{10\sqrt{3}}{3}$</p> |
| <p>5. a) $a = 6$
$b = 6$</p> | <p>b) $a = 7\sqrt{2}$
$b = 7\sqrt{2}$</p> | <p>c) $a = \frac{11\sqrt{2}}{2}$
$b = \frac{11\sqrt{2}}{2}$</p> |

Section 2.2 Trigonometry: The Triangle Identities

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

Section 2.3 Trigonometry of Special Right Triangles

<p>1.</p> 	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">$\sin 60^\circ = \frac{\sqrt{3}}{2}$</td> <td style="width: 50%;">$\sin 30^\circ = \frac{1}{2}$</td> </tr> <tr> <td>$\cos 60^\circ = \frac{1}{2}$</td> <td>$\cos 30^\circ = \frac{\sqrt{3}}{2}$</td> </tr> <tr> <td>$\tan 60^\circ = \sqrt{3}$</td> <td>$\tan 30^\circ = \frac{\sqrt{3}}{3}$</td> </tr> <tr> <td>$\cot 60^\circ = \frac{\sqrt{3}}{3}$</td> <td>$\cot 30^\circ = \sqrt{3}$</td> </tr> <tr> <td>$\sec 60^\circ = 2$</td> <td>$\sec 30^\circ = \frac{2\sqrt{3}}{3}$</td> </tr> <tr> <td>$\csc 60^\circ = \frac{2\sqrt{3}}{3}$</td> <td>$\csc 30^\circ = 2$</td> </tr> </table>	$\sin 60^\circ = \frac{\sqrt{3}}{2}$	$\sin 30^\circ = \frac{1}{2}$	$\cos 60^\circ = \frac{1}{2}$	$\cos 30^\circ = \frac{\sqrt{3}}{2}$	$\tan 60^\circ = \sqrt{3}$	$\tan 30^\circ = \frac{\sqrt{3}}{3}$	$\cot 60^\circ = \frac{\sqrt{3}}{3}$	$\cot 30^\circ = \sqrt{3}$	$\sec 60^\circ = 2$	$\sec 30^\circ = \frac{2\sqrt{3}}{3}$	$\csc 60^\circ = \frac{2\sqrt{3}}{3}$	$\csc 30^\circ = 2$
$\sin 60^\circ = \frac{\sqrt{3}}{2}$	$\sin 30^\circ = \frac{1}{2}$												
$\cos 60^\circ = \frac{1}{2}$	$\cos 30^\circ = \frac{\sqrt{3}}{2}$												
$\tan 60^\circ = \sqrt{3}$	$\tan 30^\circ = \frac{\sqrt{3}}{3}$												
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$\sec 60^\circ = 2$	$\sec 30^\circ = \frac{2\sqrt{3}}{3}$												
$\csc 60^\circ = \frac{2\sqrt{3}}{3}$	$\csc 30^\circ = 2$												

- 3.** In a 45-45-90 triangle, the adjacent side and the opposite side are the same, so
- $$\sin(45^\circ) = \frac{\text{opp}}{\text{hyp}} = \frac{\text{adj}}{\text{hyp}} = \cos(45^\circ)$$

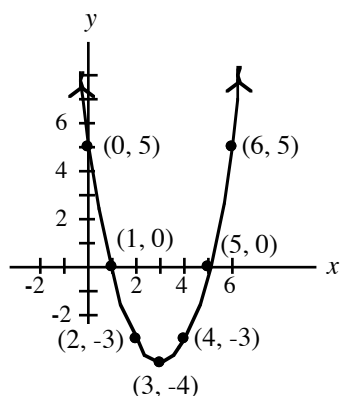
5. 1 7. -5 9. 1 11. $\frac{\sqrt{2}}{2}$
 13. $\frac{1}{2}$ 15. $\frac{1}{3}$

Section 2.4 Points in the x - y -Plane

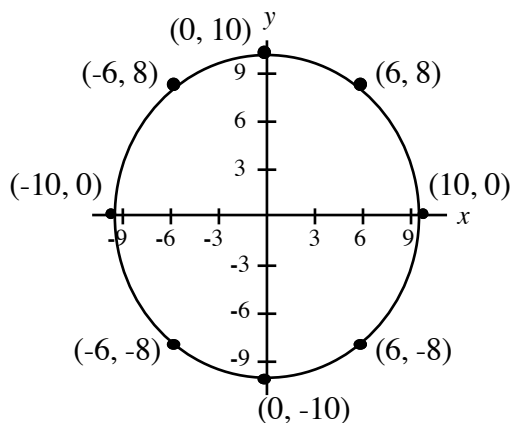
1. Quad III and IV 3. Quad II and IV 5. Quad II and III 7. Quad I and III
 9. (See graph below) 11. $d = 5$ 13. $d = 5\sqrt{5}$ 15. (See graph below)

9.

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



15. a) $r = 10$
 c) $x^2 + y^2 = 100$



#17 & 19 are started but left incomplete here.

17. $\left(\frac{3}{5}\right)^2 + \left(-\frac{4}{5}\right)^2 = ?$ 19. $\left(-\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2 = ?$

Section 2.5 Trigonometry in the x - y -Plane

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

<p>1.</p> $r = 2\sqrt{10}$ $\sin \theta = \frac{3\sqrt{10}}{10}$ $\cos \theta = \frac{\sqrt{10}}{10}$ $\tan \theta = 3$ $\cot \theta = \frac{1}{3}$ $\sec \theta = \sqrt{10}$ $\csc \theta = \frac{\sqrt{10}}{3}$	<p>3.</p> $r = 5$ $\sin \theta = -1$ $\cos \theta = 0$ $\tan \theta$ is undefined $\cot \theta = 0$ $\sec \theta$ is undefined $\csc \theta = -1$	<p>5.</p> $r = 4$ $\sin \theta = \frac{-3}{4}$ $\cos \theta = \frac{-\sqrt{7}}{4}$ $\tan \theta = \frac{3\sqrt{7}}{7}$ $\cot \theta = \frac{\sqrt{7}}{3}$ $\sec \theta = \frac{-4\sqrt{7}}{7}$ $\csc \theta = \frac{-4}{3}$
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7. 70°

9. 25°

11. 20°

13. 35°

15. Quad II

17. Quad II

19. Quad I

21. Quad II

23.	$\sin \theta = \frac{3}{5}$	25.	$\sin \theta = \frac{-\sqrt{11}}{6}$	27.	$\sin \theta = \frac{-3\sqrt{10}}{10}$	29.	$\sin \theta = \frac{-\sqrt{15}}{4}$
	$\cos \theta = \frac{-4}{5}$		$\cos \theta = \frac{-5}{6}$		$\cos \theta = \frac{-\sqrt{10}}{10}$		$\cos \theta = \frac{1}{4}$
	$\tan \theta = \frac{-3}{4}$		$\tan \theta = \frac{\sqrt{11}}{5}$		$\tan \theta = 3$		$\tan \theta = -\sqrt{15}$

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

Section 2.7 Proving Trigonometric Identities

1. $\sin \theta$

3. $\cos \theta$

5. $\frac{\cos^2 \theta}{\sin \theta}$

7. $\frac{\sin \theta + 1}{\cos \theta}$

9. 0

11. LCD = $\cos^2 \theta$; $\frac{\cos \theta + 1}{\cos^2 \theta}$

13. LCD = $\sin \theta \cos \theta$; $\frac{\sin \theta}{\cos \theta}$ or $\tan \theta$

15. $\sin \theta - \cos^2 \theta$

17. $\cos^2 \theta + 3\cos \theta + 2$

#19-25, odd, not shown.