

Answer Key: Chapter 7 - Nature of Trigonometric Functions in Quadrants

Objective: Solutions are checked for mathematical accuracy. Equivalent exact forms are acceptable where appropriate.

1. Answer: Positive <i>Work:</i> Using the quadrant sign pattern, $\sin \theta$ is positive in Quadrant II.	2. Answer: Negative <i>Work:</i> Using the quadrant sign pattern, $\cos \theta$ is negative in Quadrant III.
3. Answer: Negative <i>Work:</i> Using the quadrant sign pattern, $\tan \theta$ is negative in Quadrant IV.	4. Answer: Negative <i>Work:</i> Using the quadrant sign pattern, $\sec \theta$ is negative in Quadrant II.
5. Answer: Negative <i>Work:</i> Using the quadrant sign pattern, $\csc \theta$ is negative in Quadrant III.	6. Answer: Negative <i>Work:</i> Using the quadrant sign pattern, $\cot \theta$ is negative in Quadrant IV.
7. Answer: Positive <i>Work:</i> Using the quadrant sign pattern, $\tan \theta$ is positive in Quadrant III.	8. Answer: Positive <i>Work:</i> Using the quadrant sign pattern, $\sec \theta$ is positive in Quadrant IV.
9. Answer: Positive <i>Work:</i> Using the quadrant sign pattern, $\csc \theta$ is positive in Quadrant II.	10. Answer: Negative <i>Work:</i> Using the quadrant sign pattern, $\cot \theta$ is negative in Quadrant II.

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11. Answer: Quadrant II <i>Work:</i> Match the signs of the given functions with the ASTC/quadrant sign pattern.	12. Answer: Quadrant III <i>Work:</i> Match the signs of the given functions with the ASTC/quadrant sign pattern.
13. Answer: Quadrant IV <i>Work:</i> Match the signs of the given functions with the ASTC/quadrant sign pattern.	14. Answer: Quadrant IV <i>Work:</i> Match the signs of the given functions with the ASTC/quadrant sign pattern.
15. Answer: Quadrant I <i>Work:</i> Match the signs of the given functions with the ASTC/quadrant sign pattern.	16. Answer: Quadrant III <i>Work:</i> Match the signs of the given functions with the ASTC/quadrant sign pattern.
17. Answer: Quadrant I <i>Work:</i> Match the signs of the given functions with the ASTC/quadrant sign pattern.	18. Answer: Quadrant II <i>Work:</i> Match the signs of the given functions with the ASTC/quadrant sign pattern.
19. Answer: Quadrant III <i>Work:</i> Match the signs of the given functions with the ASTC/quadrant sign pattern.	20. Answer: Quadrant II <i>Work:</i> Match the signs of the given functions with the ASTC/quadrant sign pattern.

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21. Answer: $\cos \theta = -\frac{4}{5}$, $\tan \theta = -\frac{3}{4}$ <i>Work:</i> Use $\sin^2 \theta + \cos^2 \theta = 1$ (or a right-triangle ratio) and apply Quadrant II signs; $3^2 + 4^2 = 5^2$.	22. Answer: $\sin \theta = -\frac{12}{13}$, $\tan \theta = \frac{12}{5}$ <i>Work:</i> Use $\sin^2 \theta + \cos^2 \theta = 1$ (or a right-triangle ratio) and apply Quadrant III signs; $5^2 + 12^2 = 13^2$.
23. Answer: $\sin \theta = -\frac{8}{17}$, $\cos \theta = \frac{15}{17}$ <i>Work:</i> Use $\sin^2 \theta + \cos^2 \theta = 1$ (or a right-triangle ratio) and apply Quadrant IV signs; $8^2 + 15^2 = 17^2$.	24. Answer: $\cos \theta = -\frac{4}{5}$, $\sin \theta = \frac{3}{5}$, $\tan \theta = -\frac{3}{4}$ <i>Work:</i> Use $\sin^2 \theta + \cos^2 \theta = 1$ (or a right-triangle ratio) and apply Quadrant II signs; $\sec \theta = 1/\cos \theta$.
25. Answer: $\sin \theta = -\frac{12}{13}$, $\cos \theta = -\frac{5}{13}$, $\tan \theta = \frac{12}{5}$ <i>Work:</i> Use $\sin^2 \theta + \cos^2 \theta = 1$ (or a right-triangle ratio) and apply Quadrant III signs; $\csc \theta = 1/\sin \theta$.	26. Answer: $\sin \theta = \frac{24}{25}$, $\cos \theta = -\frac{7}{25}$, $\tan \theta = -\frac{24}{7}$ <i>Work:</i> Use $\sin^2 \theta + \cos^2 \theta = 1$ (or a right-triangle ratio) and apply Quadrant II signs; $7^2 + 24^2 = 25^2$.
27. Answer: $\cos \theta = \frac{12}{13}$, $\tan \theta = -\frac{5}{12}$ <i>Work:</i> Use $\sin^2 \theta + \cos^2 \theta = 1$ (or a right-triangle ratio) and apply Quadrant IV signs; $5^2 + 12^2 = 13^2$.	28. Answer: $\sin \theta = -\frac{15}{17}$, $\tan \theta = -\frac{15}{8}$ <i>Work:</i> Use $\sin^2 \theta + \cos^2 \theta = 1$ (or a right-triangle ratio) and apply Quadrant IV signs; $8^2 + 15^2 = 17^2$.
29. Answer: $\sin \theta = -\frac{24}{25}$, $\cos \theta = -\frac{7}{25}$ <i>Work:</i> Use $\sin^2 \theta + \cos^2 \theta = 1$ (or a right-triangle ratio) and apply Quadrant III signs; $7^2 + 24^2 = 25^2$.	30. Answer: $\cos \theta = -\frac{5}{13}$, $\sin \theta = -\frac{12}{13}$, $\tan \theta = \frac{12}{5}$ <i>Work:</i> Use $\sin^2 \theta + \cos^2 \theta = 1$ (or a right-triangle ratio) and apply Quadrant III signs; $5^2 + 12^2 = 13^2$.

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31. Answer: $\frac{1}{2}$ <i>Work:</i> Use the reference angle and the sign of the function in that quadrant.	32. Answer: $-\frac{\sqrt{3}}{2}$ <i>Work:</i> Use the reference angle and the sign of the function in that quadrant.
33. Answer: -1 <i>Work:</i> Use the reference angle and the sign of the function in that quadrant.	34. Answer: -2 <i>Work:</i> Use the reference angle and the sign of the function in that quadrant.
35. Answer: $-\sqrt{2}$ <i>Work:</i> Use the reference angle and the sign of the function in that quadrant.	36. Answer: $-\sqrt{3}$ <i>Work:</i> Use the reference angle and the sign of the function in that quadrant.
37. Answer: $-\frac{\sqrt{3}}{2}$ <i>Work:</i> Use the reference angle and the sign of the function in that quadrant.	38. Answer: $\frac{1}{2}$ <i>Work:</i> Use the reference angle and the sign of the function in that quadrant.
39. Answer: -1 <i>Work:</i> Use the reference angle and the sign of the function in that quadrant.	40. Answer: -2 <i>Work:</i> Use the reference angle and the sign of the function in that quadrant.

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41. Answer: Negative <i>Work:</i> Apply Quadrant II signs to each factor; the overall expression is negative.	42. Answer: Positive <i>Work:</i> Apply Quadrant III signs to each factor; the overall expression is positive.
43. Answer: Negative <i>Work:</i> Apply Quadrant IV signs to each factor; the overall expression is negative.	44. Answer: Positive <i>Work:</i> Apply Quadrant II signs to each factor; the overall expression is positive.
45. Answer: Negative <i>Work:</i> Apply Quadrant III signs to each factor; the overall expression is negative.	46. Answer: Quadrant II <i>Work:</i> The signs of sine/cosine/tangent (and their reciprocals) uniquely identify the quadrant.
47. Answer: Quadrant IV <i>Work:</i> The signs of sine/cosine/tangent (and their reciprocals) uniquely identify the quadrant.	48. Answer: Quadrant III <i>Work:</i> The signs of sine/cosine/tangent (and their reciprocals) uniquely identify the quadrant.
49. Answer: Quadrant IV <i>Work:</i> The signs of sine/cosine/tangent (and their reciprocals) uniquely identify the quadrant.	50. Answer: Quadrant IV <i>Work:</i> The signs of sine/cosine/tangent (and their reciprocals) uniquely identify the quadrant.