

Answer Key: Chapter 1 - Trigonometric Ratios

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

1. Answer: $\frac{3}{5}$ <i>Work:</i> $h = 5$, so $\sin \theta = \frac{\text{opp}}{h} = \frac{3}{5}$.	2. Answer: $\frac{12}{13}$ <i>Work:</i> The missing adjacent side is 12; $\cos \theta = \frac{12}{13}$.
3. Answer: $\frac{7}{24}$ <i>Work:</i> The missing opposite side is 7; $\tan \theta = \frac{7}{24}$.	4. Answer: $\frac{15}{17}$ <i>Work:</i> $h = 17$, so $\cos \theta = \frac{15}{17}$.
5. Answer: $\frac{40}{9}$ <i>Work:</i> The adjacent side is 40; $\cot \theta = \frac{40}{9}$.	6. Answer: $\frac{12}{37}$ <i>Work:</i> The opposite side is 12; $\sin \theta = \frac{12}{37}$.
7. Answer: $\frac{29}{21}$ <i>Work:</i> $h = 29$, so $\sec \theta = \frac{h}{\text{adj}} = \frac{29}{21}$.	8. Answer: $\frac{61}{11}$ <i>Work:</i> The opposite side is 11; $\csc \theta = \frac{61}{11}$.
9. Answer: $\frac{28}{45}$ <i>Work:</i> $\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{28}{45}$.	10. Answer: $\frac{56}{65}$ <i>Work:</i> The adjacent side is 56; $\cos \theta = \frac{56}{65}$.

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11. Answer: $\frac{5}{3}$ <i>Work:</i> $h = 10$; $\csc \theta = \frac{10}{6} = \frac{5}{3}$.	12. Answer: $\frac{12}{5}$ <i>Work:</i> The opposite side is 24; $\tan \theta = \frac{24}{10} = \frac{12}{5}$.
13. Answer: $\frac{25}{24}$ <i>Work:</i> The adjacent side is 48; $\sec \theta = \frac{50}{48} = \frac{25}{24}$.	14. Answer: $\frac{15}{8}$ <i>Work:</i> $\cot \theta = \frac{30}{16} = \frac{15}{8}$.
15. Answer: $\frac{4}{5}$ <i>Work:</i> The opposite side is 24; $\sin \theta = \frac{24}{30} = \frac{4}{5}$.	16. Answer: $\frac{24}{25}$ <i>Work:</i> $h = 75$; $\cos \theta = \frac{72}{75} = \frac{24}{25}$.
17. Answer: $\frac{20}{21}$ <i>Work:</i> The adjacent side is 42; $\tan \theta = \frac{40}{42} = \frac{20}{21}$.	18. Answer: $\frac{85}{13}$ <i>Work:</i> The opposite side is 13; $\csc \theta = \frac{85}{13}$.
19. Answer: $\frac{73}{55}$ <i>Work:</i> $h = 73$; $\sec \theta = \frac{73}{55}$.	20. Answer: $\frac{36}{85}$ <i>Work:</i> $h = 85$; $\sin \theta = \frac{36}{85}$.

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21. Answer: $\frac{12}{13}$ <i>Work:</i> Use the 5-12-13 triangle.	22. Answer: $\frac{15}{8}$ <i>Work:</i> Use the 8-15-17 triangle: $\tan \theta = \frac{15}{8}$.
23. Answer: $\frac{25}{24}$ <i>Work:</i> Use the 7-24-25 triangle: $\sec \theta = \frac{25}{24}$.	24. Answer: $\frac{13}{5}$ <i>Work:</i> Use the 5-12-13 triangle: $\csc \theta = \frac{13}{5}$.
25. Answer: $\frac{12}{37}$ <i>Work:</i> Use the 12-35-37 triangle.	26. Answer: $\frac{21}{20}$ <i>Work:</i> Use the 20-21-29 triangle: $\cot \theta = \frac{21}{20}$.
27. Answer: $\frac{9}{40}$ <i>Work:</i> Use the 9-40-41 triangle.	28. Answer: $\frac{65}{33}$ <i>Work:</i> Use the 33-56-65 triangle: $\csc \theta = \frac{65}{33}$.
29. Answer: $\frac{21}{29}$ <i>Work:</i> Use the 20-21-29 triangle.	30. Answer: $\frac{53}{45}$ <i>Work:</i> Use the 28-45-53 triangle.

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31. Answer: Opposite = 21, hypotenuse = 35 <i>Work:</i> Scale 3 : 4 : 5 by 7.	32. Answer: Opposite = 20, adjacent = 48 <i>Work:</i> Scale 5 : 12 : 13 by 4.
33. Answer: Hypotenuse = 39, opposite = 15 <i>Work:</i> Scale 5 : 12 : 13 by 3.	34. Answer: Adjacent = 48, hypotenuse = 50 <i>Work:</i> Scale 7 : 24 : 25 by 2.
35. Answer: Hypotenuse = 51, opposite = 24 <i>Work:</i> Scale 8 : 15 : 17 by 3.	36. Answer: Hypotenuse = 75, adjacent = 72 <i>Work:</i> Scale 7 : 24 : 25 by 3.
37. Answer: Adjacent = 75, hypotenuse = 85 <i>Work:</i> Scale 8 : 15 : 17 by 5.	38. Answer: Hypotenuse = 74, adjacent = 70 <i>Work:</i> Scale 12 : 35 : 37 by 2.
39. Answer: Adjacent = 60, opposite = 63 <i>Work:</i> Scale 20 : 21 : 29 by 3.	40. Answer: Opposite = 66, hypotenuse = 130 <i>Work:</i> Scale 33 : 56 : 65 by 2.

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41. Answer: $\sin \theta = \frac{3}{5}$, $\cos \theta = \frac{4}{5}$, $\tan \theta = \frac{3}{4}$; $\csc \theta = \frac{5}{3}$, $\sec \theta = \frac{5}{4}$, $\cot \theta = \frac{4}{3}$ Work: Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$ and reciprocals.	42. Answer: $\sin \theta = \frac{5}{13}$, $\cos \theta = \frac{12}{13}$, $\tan \theta = \frac{5}{12}$; $\csc \theta = \frac{13}{5}$, $\sec \theta = \frac{13}{12}$, $\cot \theta = \frac{12}{5}$ Work: Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$ and reciprocals.
43. Answer: $\sin \theta = \frac{8}{17}$, $\cos \theta = \frac{15}{17}$, $\tan \theta = \frac{8}{15}$; $\csc \theta = \frac{17}{8}$, $\sec \theta = \frac{17}{15}$, $\cot \theta = \frac{15}{8}$ Work: Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$ and reciprocals.	44. Answer: $\sin \theta = \frac{7}{25}$, $\cos \theta = \frac{24}{25}$, $\tan \theta = \frac{7}{24}$; $\csc \theta = \frac{25}{7}$, $\sec \theta = \frac{25}{24}$, $\cot \theta = \frac{24}{7}$ Work: Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$ and reciprocals.
45. Answer: $\sin \theta = \frac{12}{37}$, $\cos \theta = \frac{35}{37}$, $\tan \theta = \frac{12}{35}$; $\csc \theta = \frac{37}{12}$, $\sec \theta = \frac{37}{35}$, $\cot \theta = \frac{35}{12}$ Work: Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$ and reciprocals.	46. Answer: $\sin \theta = \frac{20}{29}$, $\cos \theta = \frac{21}{29}$, $\tan \theta = \frac{20}{21}$; $\csc \theta = \frac{29}{20}$, $\sec \theta = \frac{29}{21}$, $\cot \theta = \frac{21}{20}$ Work: Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$ and reciprocals.
47. Answer: $\sin \theta = \frac{28}{53}$, $\cos \theta = \frac{45}{53}$, $\tan \theta = \frac{28}{45}$; $\csc \theta = \frac{53}{28}$, $\sec \theta = \frac{53}{45}$, $\cot \theta = \frac{45}{28}$ Work: Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$ and reciprocals.	48. Answer: $\sin \theta = \frac{33}{65}$, $\cos \theta = \frac{56}{65}$, $\tan \theta = \frac{33}{56}$; $\csc \theta = \frac{65}{33}$, $\sec \theta = \frac{65}{56}$, $\cot \theta = \frac{56}{33}$ Work: Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$ and reciprocals.
49. Answer: $\sin \theta = \frac{11}{61}$, $\cos \theta = \frac{60}{61}$, $\tan \theta = \frac{11}{60}$; $\csc \theta = \frac{61}{11}$, $\sec \theta = \frac{61}{60}$, $\cot \theta = \frac{60}{11}$ Work: Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$ and reciprocals.	50. Answer: $\sin \theta = \frac{9}{41}$, $\cos \theta = \frac{40}{41}$, $\tan \theta = \frac{9}{40}$; $\csc \theta = \frac{41}{9}$, $\sec \theta = \frac{41}{40}$, $\cot \theta = \frac{40}{9}$ Work: Use $\sin = \frac{o}{h}$, $\cos = \frac{a}{h}$, $\tan = \frac{o}{a}$ and reciprocals.