

Answer Key: Chapter 9 - More About Inverse Trigonometric Functions

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

1. Answer: $\frac{\pi}{6}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.	2. Answer: $-\frac{\pi}{4}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.
3. Answer: $\frac{\pi}{3}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.	4. Answer: $\frac{5\pi}{6}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.
5. Answer: $\frac{\pi}{4}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.	6. Answer: $-\frac{\pi}{3}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.
7. Answer: 0 <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.	8. Answer: π <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.
9. Answer: 0 <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.	10. Answer: $\frac{\pi}{2}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.

Answer Key: Chapter 9 - More About Inverse Trigonometric Functions

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

11. Answer: $\frac{\pi}{3}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.	12. Answer: $\frac{3\pi}{4}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.
13. Answer: $\frac{\pi}{6}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.	14. Answer: $-\frac{\pi}{2}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.
15. Answer: $\frac{\pi}{4}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.	16. Answer: $-\frac{\pi}{4}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.
17. Answer: $\frac{\pi}{4}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.	18. Answer: $\frac{2\pi}{3}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.
19. Answer: $\frac{\pi}{3}$ <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.	20. Answer: 0 <i>Work:</i> Use the principal range of the inverse function and the unit-circle exact values.

Answer Key: Chapter 9 - More About Inverse Trigonometric Functions

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

21. Answer: $\frac{4}{5}$ <i>Work:</i> Let u be the inverse-trig angle. Build a right triangle: $\cos u = \frac{3}{5} \Rightarrow \sin u = \frac{4}{5}$.	22. Answer: $\frac{12}{13}$ <i>Work:</i> Let u be the inverse-trig angle. Build a right triangle: $\sin u = \frac{5}{13} \Rightarrow \cos u = \frac{12}{13}$.
23. Answer: $\frac{3}{4}$ <i>Work:</i> Let u be the inverse-trig angle. Build a right triangle: $\sin u = \frac{3}{5} \Rightarrow \tan u = \frac{3}{4}$.	24. Answer: $\frac{7}{25}$ <i>Work:</i> Let u be the inverse-trig angle. Build a right triangle: $7^2 + 24^2 = 25^2$.
25. Answer: $\frac{12}{13}$ <i>Work:</i> Let u be the inverse-trig angle. Build a right triangle: $5^2 + 12^2 = 13^2$.	26. Answer: $\frac{15}{8}$ <i>Work:</i> Let u be the inverse-trig angle. Build a right triangle: $8^2 + 15^2 = 17^2$.
27. Answer: $\frac{15}{17}$ <i>Work:</i> Let u be the inverse-trig angle. Build a right triangle: $\sin^{-1}$ has range $[-\pi/2, \pi/2]$, $\cos u \geq 0$.	28. Answer: $\frac{12}{13}$ <i>Work:</i> Let u be the inverse-trig angle. Build a right triangle: $\cos^{-1}$ has range $[0, \pi]$, $\sin u \geq 0$.
29. Answer: $-\frac{12}{5}$ <i>Work:</i> Let u be the inverse-trig angle. Build a right triangle: $5^2 + 12^2 = 13^2$.	30. Answer: $\frac{4}{5}$ <i>Work:</i> Let u be the inverse-trig angle. Build a right triangle: $3^2 + 4^2 = 5^2$.

Answer Key: Chapter 9 - More About Inverse Trigonometric Functions

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

31. Answer: 38.3° <i>Work:</i> Apply the appropriate inverse trig function in degree mode.	32. Answer: 110.5° <i>Work:</i> Apply the appropriate inverse trig function in degree mode.
33. Answer: 60.9° <i>Work:</i> Apply the appropriate inverse trig function in degree mode.	34. Answer: -0.848 rad <i>Work:</i> Apply the appropriate inverse trig function in radian mode.
35. Answer: 1.369 rad <i>Work:</i> Apply the appropriate inverse trig function in radian mode.	36. Answer: -1.176 rad <i>Work:</i> Apply the appropriate inverse trig function in radian mode.
37. Answer: 30.0° <i>Work:</i> Apply the appropriate inverse trig function in degree mode.	38. Answer: 109.5° <i>Work:</i> Apply the appropriate inverse trig function in degree mode.
39. Answer: 19.1° <i>Work:</i> Apply the appropriate inverse trig function in degree mode.	40. Answer: -0.848 rad <i>Work:</i> Apply the appropriate inverse trig function in radian mode.

Answer Key: Chapter 9 - More About Inverse Trigonometric Functions

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

41. Answer: Domain: $[-1, 1]$; Range: $[-\pi/2, \pi/2]$ <i>Work:</i> These restrictions make sine one-to-one before inversion.	42. Answer: Domain: $[-1, 1]$; Range: $[0, \pi]$ <i>Work:</i> These restrictions make cosine one-to-one before inversion.
43. Answer: Domain: $(-\infty, \infty)$; Range: $(-\pi/2, \pi/2)$ <i>Work:</i> Tangent takes every real value on its principal interval.	44. Answer: $\cos^{-1} x$ <i>Work:</i> The range of arccos is $[0, \pi]$, which includes Quadrant II.
45. Answer: Only $\tan^{-1} x$ <i>Work:</i> The domains of arcsin/arccos are $[-1, 1]$, while arctan has domain all real numbers.	46. Answer: $\frac{\pi}{6}$ <i>Work:</i> $5\pi/6$ is outside the arcsin principal range; $\sin(5\pi/6) = 1/2$.
47. Answer: $\frac{3\pi}{4}$ <i>Work:</i> $\cos(5\pi/4) = -\sqrt{2}/2$ and arccos returns a value in $[0, \pi]$.	48. Answer: $-\frac{\pi}{4}$ <i>Work:</i> Tangent has period π, and arctan returns a value in $(-\pi/2, \pi/2)$.
49. Answer: $\frac{5}{13}$ <i>Work:</i> The arccos angle is in Quadrant II, so sine is positive.	50. Answer: $\frac{12}{13}$ <i>Work:</i> The arctan angle is in Quadrant IV, where cosine is positive.