Vocabulary: Fill in the blanks.

Function	Alternative Notation	Domain	Range
1. $y = \arcsin x$	_____	_____	$-\frac{\pi}{2} \le y \le \frac{\pi}{2}$
2. _____	$y = \cos^{-1} x$	$-1 \le x \le 1$	_____
3. $y = \arctan x$	_____	_____	_____

4. Without restrictions, no trigonometric function has an _____ function.

Evaluating an Inverse Trigonometric Function **In Exercises 5–18, evaluate the expression without using a calculator.**

#11 NA

5. $\arcsin \frac{1}{2}$
6. $\arcsin 0$
7. $\arccos \frac{1}{2}$
8. $\arccos 0$
9. $\arctan \frac{\sqrt{3}}{3}$
11. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$
14. $\arctan \sqrt{3}$
15. $\arccos\left(-\frac{1}{2}\right)$

Graphing an Inverse Trigonometric Function **In Exercises 19 and 20, use a graphing utility to graph f, g, and $y = x$ in the same viewing window to verify geometrically that g is the inverse function of f. (Be sure to restrict the domain of f properly.)**

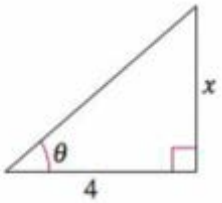
19. $f(x) = \cos x, \quad g(x) = \arccos x$
20. $f(x) = \tan x, \quad g(x) = \arctan x$

Calculators and Inverse Trigonometric Functions **In Exercises 21–38, use a calculator to evaluate the expression. Round your result to two decimal places.**

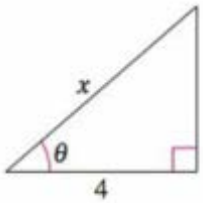
22. $\arcsin 0.65$
24. $\arccos(-0.7)$
26. $\arctan 25$

Using an Inverse Trigonometric Function **In Exercises 41–46, use an inverse trigonometric function to write θ as a function of x.**

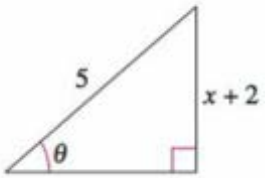
41.



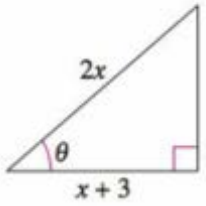
42.



43.



45.



Using Inverse Properties **In Exercises 47–52, use the properties of inverse trigonometric functions to evaluate the expression.**

#48 NA

47. $\sin(\arcsin 0.3)$
48. $\tan(\arctan 45)$

Using Inverse Properties **In Exercises 47–52, use the properties of inverse trigonometric functions to evaluate the expression.**

51. $\arcsin(\sin 3\pi)$
52. $\arccos\left(\cos \frac{7\pi}{2}\right)$

Evalu

Exercises 53–64, find the exact value of the expression. (*Hint:* Sketch a right triangle.) DRAW THE PICTURES!

53. $\sin\left(\arctan \frac{3}{4}\right)$
54. $\sec\left(\arcsin \frac{4}{5}\right)$

#56 NA

55. $\cos(\tan^{-1} 2)$
56. $\sin\left(\cos^{-1} \frac{\sqrt{5}}{5}\right)$
58. $\csc\left[\arctan\left(-\frac{5}{12}\right)\right]$

Writing an Expression **In Exercises 65–74, write an algebraic expression that is equivalent to the given expression. (*Hint:* Sketch a right triangle, as demonstrated in Example 7.)**

66. $\sin(\arctan x)$
68. $\sec(\arctan 3x)$
69. $\sin(\arccos x)$
70. $\sec[\arcsin(x - 1)]$

Graphical Analysis **In Exercises 75 and 76, use a graphing utility to graph f and g in the same viewing window to verify that the two functions are equal. Explain why they are equal. Identify any asymptotes of the graphs.**

#75 NA

75. $f(x) = \sin(\arctan 2x), \quad g(x) = \frac{2x}{\sqrt{1 + 4x^2}}$
76. $f(x) = \tan\left(\arccos \frac{x}{2}\right), \quad g(x) = \frac{\sqrt{4 - x^2}}{x}$

Writing an Expression **In Exercises 65–74, write an algebraic expression that is equivalent to the given expression. (*Hint:* Sketch a right triangle, as demonstrated in Example 7.)**

66. $\sin(\arctan x)$ **68.** $\sec(\arctan 3x)$ **74.** $\cos\left(\arcsin\dfrac{x-h}{r}\right)$

69. $\sin(\arccos x)$ **70.** $\sec[\arcsin(x-1)]$

Comparing Graphs **In Exercises 81 and 82, sketch a graph of the function and compare the graph of g with the graph of $f(x) = \arcsin x$.**

81. $g(x) = \arcsin(x-1)$ **82.** $g(x) = \arcsin\dfrac{x}{2}$

Graphing an Inverse Trigonometric Function **In Exercises 89–94, use a graphing utility to graph the function.**

90. $f(x) = \pi \arcsin(4x$ **91.** $f(x) = \arctan(2x-3)$

94. $f(x) = \dfrac{\pi}{2} + \cos^{-1}\left(\dfrac{1}{\pi}\right)$

Behavior of an Inverse Trigonometric Function **In Exercises 97–102, fill in the blank. If not possible, state the reason.**

102. As $x \to -\infty$, the value of $\arctan x \to$ ____.