

Name \_\_\_\_\_

**Homework #21C: Derivatives of Inverse Trig Functions**

- p.170 (4, 6, 11, 12, 14, 25, 27)

In Exercises 1–8, find the derivative of  $y$  with respect to the appropriate variable.

4.  $y = \sin^{-1}(1 - t)$

6.  $y = s\sqrt{1 - s^2} + \cos^{-1} s$

In Exercises 9–12, a particle moves along the  $x$ -axis so that its position at any time  $t \geq 0$  is given by  $x(t)$ . Find the velocity at the indicated value of  $t$ .

11.  $x(t) = \tan^{-1} t, \quad t = 2$

12.  $x(t) = \tan^{-1}(t^2), \quad t = 1$

In Exercises 13–22, find the derivatives of  $y$  with respect to the appropriate variable.

14.  $y = \sec^{-1} 5s$

In Exercises 23–26, find an equation for the tangent to the graph of  $y$  at the indicated point.

25.  $y = \sin^{-1}\left(\frac{x}{4}\right), \quad x = 3$

27. (a) Find an equation for the line tangent to the graph of  $y = \tan x$  at the point  $(\pi/4, 1)$ .

(b) Find an equation for the line tangent to the graph of  $y = \tan^{-1} x$  at the point  $(1, \pi/4)$ .

- p.170 (5, 7–10, 13, 15, 18, 20)

In Exercises 1–8, find the derivative of  $y$  with respect to the appropriate variable.

5.  $y = \sin^{-1} \frac{3}{t^2}$

7.  $y = x \sin^{-1} x + \sqrt{1 - x^2}$       8.  $y = \frac{1}{\sin^{-1}(2x)}$

In Exercises 9–12, a particle moves along the  $x$ -axis so that its position at any time  $t \geq 0$  is given by  $x(t)$ . Find the velocity at the indicated value of  $t$ .

9.  $x(t) = \sin^{-1}\left(\frac{t}{4}\right), \quad t = 3$       10.  $x(t) = \sin^{-1}\left(\frac{\sqrt{t}}{4}\right), \quad t = 4$

In Exercises 13–22, find the derivatives of  $y$  with respect to the appropriate variable.

13.  $y = \sec^{-1}(2s + 1)$

15.  $y = \csc^{-1}(x^2 + 1), \quad x > 0$

18.  $y = \cot^{-1} \sqrt{t}$

20.  $y = \sqrt{s^2 - 1} - \sec^{-1} s$