

EXAMPLE 5 Differentiate (a) $y = \frac{1}{\sin^{-1}x}$ and (b) $f(x) = x \tan^{-1}\sqrt{x}$.

SOLUTION

$$(a) \quad \frac{dy}{dx} = \frac{d}{dx} (\sin^{-1}x)^{-1} = -(\sin^{-1}x)^{-2} \frac{d}{dx} (\sin^{-1}x)$$

$$= -\frac{1}{(\sin^{-1}x)^2 \sqrt{1-x^2}}$$

$$(b) \quad f'(x) = \tan^{-1}\sqrt{x} + x \frac{1}{1+(\sqrt{x})^2} \left(\frac{1}{2}x^{-1/2}\right)$$

$$= \tan^{-1}\sqrt{x} + \frac{\sqrt{x}}{2(1+x)} \quad \square$$

25–30 □ Find an equation of the tangent line to the curve at the given point.

25. $\frac{x^2}{16} - \frac{y^2}{9} = 1$, $(-5, \frac{9}{4})$ (hyperbola)

- (c) Find the exact x -coordinates of the points in part (a).
(d) Create even more fanciful curves by modifying the equation in part (a).

34. (a) The curve with equation