

1. a. $[e^{(x^3+8)}[3x^2]] \sec\left(3x - \frac{\pi}{4}\right) + e^{(x^3+8)} \left[\sec\left(3x - \frac{\pi}{4}\right) \tan\left(3x - \frac{\pi}{4}\right) [3]\right]$

b. $\frac{[\sec^2(x^2)[2x]](\tan^2 x) - (\tan(x^2))[2 \tan x \sec^2 x]}{(\tan x)^4}$

2. a. $\frac{-49}{x^2 \sqrt{x^2+49}}$

b. $6 \arctan(3x)$

3. $y = \frac{1}{2}x - \frac{1}{2}$

4. $(-6, 149); (2, -51)$

5. When $y = 6$, $x = -2$. Implicitly differentiating yields $\frac{dx}{dt} = \frac{-2y}{3x^2} \left[\frac{dy}{dt}\right]$

Substituting values: $\left. \frac{dx}{dt} \right|_{(x,y)=(-2,6), \frac{dy}{dt}=\frac{5}{2}} = -\frac{5}{2}$

6. Note $f(1) = 6$; so $f^{-1}(6) = 1$: $\frac{d}{dx}(f^{-1}(6)) = \frac{1}{f'(f^{-1}(6))} = \frac{1}{f'(1)} = \frac{1}{7}$

7. $f''(x) = 12x^2 \cos(x^4 + \pi) - 16x^6 \sin(x^4 + \pi)$

8. $\frac{dy}{dx} = \left((\csc x)^{\sqrt[3]{x}}\right) \left[\frac{\ln(\csc x)}{3\sqrt[3]{x^2}} - \sqrt[3]{x} \cot x\right]$

9. $L(x) = f(2) + f'(2)(x - 2) = 1 + 6(x - 2)$

10. a. $m = \frac{28-0}{3-(-1)} = 7$

b. $c = \sqrt{\frac{7}{3}}$