[3.6 Solutions]

1. $\frac{dy}{dx} = 2\left(\frac{\sin x}{1+\cos(2x)}\right) \cdot \left[\frac{(1+\cos(2x))\cdot\cos x - \sin x\left(-\sin(2x)\right)\cdot 2}{[1+\cos(2x)]^2}\right]$

2. $\frac{dy}{dx} = x^3 \cdot 4(2x-5)^3 \cdot 2 + (2x-5)^4 \cdot 3x^2$

3. $\frac{dy}{dx} = \sin^3 x \sec^2(4x)\cdot 4 + \tan(4x)\cdot 3\sin^2 x(\cos x)$

4. $\frac{dy}{dx} = 3\left(1+\cos^2(7x)\right)^2 \cdot 2\cos(7x)(-\sin(7x))\cdot 7$

5. $\frac{dy}{dx} = \frac{1}{2}\left(\tan(5x)\right)^{-1/2} \cdot \sec^2(5x)\cdot 5$

6. $\frac{dy}{dx} = 2\left(x-\sin(3x)\right)\cdot\left(1-\cos(3x)\cdot 3\right)$

7. $\frac{dy}{dx} = -2\left(2x+\sqrt{x}\right)^{-3}\left(2+\frac{1}{2}x^{-1/2}\right)$

8. $\frac{d}{dx}\left[\frac{1}{g^2(x)}\right] = -2[g(x)]^{-3}\cdot g'(x)$

9. $\frac{d}{dx}\left[f(g(x)+x)\right] = f'(g(x)+x)\left[g'(x)+1\right]$

10. $\frac{d}{dx}\left[\sqrt{f^2(x)+g^2(x)}\right] = \frac{1}{2}\left(f^2(x)+g^2(x)\right)^{-1/2}\cdot\left[2f(x)f'(x)+2g(x)\cdot g'(x)\right]$

11. $\frac{d}{dx}\left[f(x)\cdot g^3(x)\right] = f(x)\cdot 3g^2(x)\cdot g'(x) + g^3(x)\cdot f'(x)$

12. $\frac{d}{dx}\left[\frac{f^2(x)}{3x-g(h(x))}\right] = \frac{(3x-g(h(x)))\cdot 2f(x)f'(x) - f^2(x)\left[3-g'(h(x))\cdot h'(x)\right]}{[3x-g(h(x))]^2}$