

8.

$$\sec(\tan x) \tan(\tan x) \sec^2 x$$

16.

$$8x^3(2x-5)^3 + 3x^2(2x-5)^4$$

22.

$$-4(1 + \cos 2x) \sin 2x$$

QR 8.

$$3\cos x + 6 \quad h(g(f(x)))$$

$$f(x) = \cos x$$

$$g(x) = \sqrt{x+2}$$

$$h(x) = 3x^2$$

$$3(\sqrt{x+2})^2$$

$$3(x+2)$$

37.

$$f(u) = \frac{2u}{u^2+1}$$

$$u = g(x) = 10x^2 + x + 1 \quad x=0$$

$$u = 1$$

$$\frac{df}{du} = \frac{(u^2+1)(2) - (2u)(2u)}{(u^2+1)^2}$$

$$\frac{4 - 4}{4}$$

16.

$$y = \underbrace{x^3}_{\text{blue}} \underbrace{(2x-5)^4}_{\text{blue}}$$

$$y' = x^3 \left(\underline{4} (2x-5)^{\underline{3}} (\underline{2}) \right) + (2x-5)^4 3x^2$$

$$8x^3 (2x-5)^3 + 3x^2 (2x-5)^4$$

56.

a. $2f(x)$ @ $x=2$
 $2f'(x)$
 $2f'(2)$
 $2\left(\frac{1}{3}\right) = \frac{2}{3}$

b. @ $x=3$
 $f(x) + g(x)$
 $f'(x) + g'(x)$
 $2\pi + 5$

c. $f(x) \cdot g(x)$ @ $x=3$
 $f(x)g'(x) + g(x)f'(x)$
 $3(5) + (-4)(2\pi)$
 $15 - 8\pi$

d. $\frac{f(x)}{g(x)}$
 $\frac{g(x)f'(x) - f(x)g'(x)}{(g(x))^2}$
 $\frac{2\left(\frac{1}{3}\right) - 8(-3)}{2^2}$
 $3\left(\frac{\frac{1}{3} + 12}{2}\right)$
 $\frac{1 + 36}{6} = \frac{37}{6}$

37. @ $x=0$
 $\frac{du}{u^2 + 1}$ $u = 10x^2 + x + 1$

$\frac{2(10x^2 + x + 1)}{(10x^2 + x + 1)^2 + 1}$

~~$\frac{((10x^2 + x + 1)^2 + 1)(2(20x + 1)) - (2(10x^2 + x + 1))(2(10x^2 + x + 1))(20x + 1)}{((10x^2 + x + 1)^2 + 1)^2}$~~

$\frac{(2)(2) - 2(2)(1)}{4} = 0$

$$\frac{2u}{u^2+1} \quad u = 10x^2 + x + 1 = 1 \quad x=0$$

$$\frac{(u^2+1)(2) - (2u)(2u)}{(u^2+1)^2}$$

$$\frac{4-4}{4}$$

55.

$$y = 2 + \tan\left(\frac{\pi x}{4}\right) \quad @ x=1 \quad (1, 2)$$

$$y = 2 + \tan\left(\frac{\pi}{4}\right) = 2$$

$$y' = 2 \left(\sec^2\left(\frac{\pi x}{4}\right) \cdot \frac{\pi}{4} \right) \Big|_{x=1}$$

$$2 \left(\sec^2\left(\frac{\pi}{4}\right) \cdot \frac{\pi}{4} \right) = 2 \left(2 \cdot \frac{\pi}{4} \right) = \pi$$

$$\frac{1}{\cos\frac{\pi}{4}}$$

$$\frac{1}{\frac{\sqrt{2}}{2}} = \frac{2}{\sqrt{2}}$$

↑
slope

tangent

$$y = \pi(x-1) + 2$$

normal

$$y = -\frac{1}{\pi}(x-1) + 2$$

wkst

$$6. \quad 4 \sec^3(2x+1)$$

$$4 \left(\left(\sec(2x+1) \right)^3 \right)$$

$$4 \left(3 \left(\sec(2x+1) \right)^2 \left(\sec(2x+1) \tan(2x+1) \right) 2 \right)$$

$$24 \sec^2(2x+1) \sec(2x+1) \tan(2x+1)$$

$$24 \sec^3(2x+1) \tan(2x+1)$$