

1) If  $y = \sqrt{\csc^3(7 - \pi x)}$ , find  $\frac{dy}{dx}$

2) Given  $y = \frac{\cos(x^5)}{\csc(ex)}$  Find  $y'$

3) Given  $y = -\csc(4 - \pi x)$  Find  $y'$

4)  $x \cos y = \tan y - 3x$  find  $\frac{dy}{dx}$

5) If velocity of a particle is  $v(t) = 2\tan^3 x$

a) Find  $a(t)$

b) find acceleration at  $t = \pi/4$

6. Find the tangent line equation for  $f(x) = 2\sec^2(2x)$  at  $x = \frac{\pi}{6}$

Quiz Review Trig Quiz #2 Morning Session

1)  $y = \sqrt{\csc^3(7-\pi x)}$  Find  $y'$

$$y = [\csc^3(7-\pi x)]^{1/2} = [\csc(7-\pi x)]^{3/2}$$

$$y' = \frac{3}{2}[\csc(7-\pi x)]^{1/2} \cdot -\csc(7-\pi x)\cot(7-\pi x) \cdot -\pi$$

$$= \boxed{\frac{3\pi}{2}[\csc(7-\pi x)]^{3/2}\cot(7-\pi x)}$$

2)  $y = \frac{\cos(x^5)}{\csc(ex)} = \cos(x^5)\sin(ex)$  Find  $y'$

$$y' = \boxed{(-\sin(x^5) \cdot 5x^4)(\sin(ex)) + \cos(x^5) \cdot \cos(ex) \cdot e}$$

$$= \boxed{-5x^4\sin(x^5)\sin(ex) + e\cos(x^5)\cos(ex)}$$

3)  $y = -\csc(4-\pi x)$  Find  $y'$  and  $y''$

$$y' = -(-\csc(4-\pi x)\cot(4-\pi x)) \cdot (-\pi) = \boxed{-\pi\csc(4-\pi x)\cot(4-\pi x)}$$

$$y'' = \underbrace{-\pi \cdot -\csc(4-\pi x)\cot(4-\pi x) \cdot (-\pi) \cdot \cot(4-\pi x)}_{f'} + \underbrace{-\pi\csc(4-\pi x) \cdot -\csc^2(4-\pi x) \cdot -\pi}_{g} \\ g$$

$$= \boxed{-\pi^2\csc(4-\pi x)\cot^2(4-\pi x) - \pi^2\csc^3(4-\pi x)}$$

4)  $xcosy = tany - 3x$  Find  $\frac{dy}{dx}$

$$(1)(cosy) + (x)(-siny)\left(\frac{dy}{dx}\right) = sec^2 y \left(\frac{dy}{dx}\right) - 3$$

$$\frac{dy}{dx}(-x\sin y) - \frac{dy}{dx}(sec^2 y) = -3 - cosy$$

$$\frac{dy}{dx}(-x\sin y - sec^2 y) = -3 - cosy$$

$$\frac{dy}{dx} = \frac{-3 - cosy}{-x\sin y - sec^2 y} = \frac{-(3 + cosy)}{-(x\sin y + sec^2 y)} = \boxed{\frac{3 + cosy}{x\sin y + sec^2 y}}$$

5)  $y = 2\tan^3 x$  Evaluate  $y'(\pi/4)$

$$y = 2[\tan x]^3$$

$$y' = 2 \cdot 3[\tan x]^2 \sec^2 x = 6\tan^2 x \sec^2 x$$

$$y'(\pi/4) = 6[\tan(\pi/4)]^2 [\sec(\pi/4)]^2$$

$$= 6(1)^2 (\sqrt{2})^2$$

$$= 6(1)(2)$$

$$\boxed{y'(\pi/4) = 12}$$

6) Find tangent line equation at  $x = \pi/6$  for  $f(x) = 2\sec^2(2x)$

$$f(x) = 2[\sec(2x)]^2 \quad f'(x) = 2 \cdot 2[\sec(2x)] \sec(2x) \tan(2x) \cdot 2 = \underline{8\sec^2(2x)\tan(2x)}$$

$$f'(\pi/6) = 8[\sec(\frac{2\pi}{6})]^2 \tan(\frac{2\pi}{6}) = 8(2)^2(\sqrt{3}) = \underline{32\sqrt{3}} \quad \text{point: } f(\pi/6) = 2[\sec(\frac{2\pi}{6})]^2 = \underline{8}$$

point:  $(\pi/6, 8)$

$$y - y_1 = m(x - x_1)$$

slope:  $m = 32\sqrt{3}$

$$\boxed{y - 8 = 32\sqrt{3}(x - \pi/6)}$$

Quiz Review Trig Quiz #2 Morning Session

1)  $y = \sqrt{\csc^3(7-\pi x)}$  Find  $y'$

$$y = \left[ \csc^3(7-\pi x) \right]^{\frac{1}{2}} = \left[ \csc(7-\pi x) \right]^{\frac{3}{2}}$$

$$y' = \frac{3}{2} \left[ \csc(7-\pi x) \right]^{\frac{1}{2}} \cdot -\csc(7-\pi x) \cot(7-\pi x) \cdot -\pi$$

$$= \boxed{\frac{3\pi}{2} \left[ \csc(7-\pi x) \right]^{\frac{1}{2}} \cot(7-\pi x)}$$

2)  $y = \frac{\cos(x^5)}{\csc(x)}$  Find  $y'$

$$y' = (-\sin(x^5) \cdot 5x^4) / \csc(x) + \cos(x^5) \cdot \cot(x)$$

$$= \boxed{-5x^4 \sin(x^5) \csc(x) + \cos(x^5) \cot(x) \cdot e}$$

3)  $y = -\csc(4-\pi x)$  Find  $y'$  and  $y''$

$$y' = -(-\csc(4-\pi x)) \cdot (-\pi) = \boxed{-\pi \csc(4-\pi x) \cot(4-\pi x)}$$

$$y'' = -\pi \cdot -\csc(4-\pi x) \cdot \cot(4-\pi x) \cdot (-\pi) \cdot \cot(4-\pi x) + -\pi \csc(4-\pi x) \cdot -\csc^2(4-\pi x) \cdot -\pi$$

$$= \boxed{-\pi^2 \csc(4-\pi x) \cot^2(4-\pi x) - \pi^2 \csc^3(4-\pi x)}$$

4)  $x \cos y = \tan y - 3x$  Find  $\frac{dy}{dx}$

$$(1) \cos y + (x)(-\sin y) \left( \frac{dy}{dx} \right) = \sec^2 y \left( \frac{dy}{dx} \right) - 3$$

$$\frac{dy}{dx} (-x \sin y) - \frac{dy}{dx} (\sec^2 y) = -3 - \cos y$$

$$\frac{dy}{dx} (-x \sin y - \sec^2 y) = -3 - \cos y$$

$$\frac{dy}{dx} = \frac{-3 - \cos y}{-x \sin y - \sec^2 y} = \frac{-(3 + \cos y)}{(x \sin y + \sec^2 y)} = \boxed{\frac{3 + \cos y}{x \sin y + \sec^2 y}}$$

5)  $y = 2 \tan^3 x$  Evaluate  $y'(\frac{\pi}{4})$

$$y = 2 \left[ \tan x \right]^3$$

$$y' = 2 \cdot 3 \left[ \tan x \right]^2 \sec^2 x = 6 \tan^2 x \sec x$$

$$y'(\frac{\pi}{4}) = 6 \left[ \tan(\frac{\pi}{4}) \right]^2 \left[ \sec(\frac{\pi}{4}) \right]^2$$

$$= 6 \left( \sqrt{2} \right)^2 \left( \sqrt{2} \right)^2$$

$$= 6(4)$$

$$\boxed{y'(\frac{\pi}{4}) = 12}$$

6) Find tangent line equation at  $x = \frac{\pi}{6}$  for  $f(x) = 2 \sec^2(2x)$

$$f(x) = 2 \left[ \sec(2x) \right]^2 \quad f'(x) = 2 \cdot 2 \left[ \sec(2x) \right] \sec(2x) \tan(2x) \cdot 2 = \underline{8 \sec^2(2x) \tan(2x)}$$

$$f'(\frac{\pi}{6}) = 8 \left[ \sec(\frac{\pi}{3}) \right]^2 \tan(\frac{\pi}{3}) = 8(2)^2(\sqrt{3}) = \underline{32\sqrt{3}}$$

point:  $f(\frac{\pi}{6}) = 2 \left[ \sec(\frac{\pi}{6}) \right]^2 = \underline{8}$

slope:  $m = 32\sqrt{3}$

$$\boxed{y - 8 = 32\sqrt{3}(x - \frac{\pi}{6})}$$