2.4 (p140) (39)

$$y = \sin(\pi x)^2$$

$$y = \sin(\pi^2 x^2)$$

$$y' = \cos(\pi^2 x^2)(2\pi^2 x)$$

or $$y' = 2\pi^2 x \cos(\pi x)^2$$

p 2.4 (p140) (41)

$$h(x) = \sin 2x \cos 2x$$

$$h'(x) = \sin 2x(-2\sin 2x) + 2\cos 2x \cos 2x$$

$$h'(x) = -2\sin^2 2x + 2\cos^2 2x$$

$$h'(x) = -2(\sin^2 2x - \cos^2 2x)$$

$$h'(x) = 2(\cos^2 2x - \sin^2 2x)$$

$$h(x) = 2(\cos(4x))$$

(cosine double angle formula)

$$\cos(a+b) = \cos a \cos b - \sin a \sin b$$

$$\cos(a+a) = \cos a \cos a - \sin a \sin a$$

$$\cos(2a) = \cos^2 a - \sin^2 a$$

$$a \longmapsto 2x$$

$$\cos(4x) = \cos^2 2x - \sin^2 2x$$

Trig ID Review

$$\sin(a+b) = \sin a \cos b + \sin b \cos a$$

$$\sin(a+a) = \sin a \cos a + \sin a \cos a$$

$$\sin(2a) = 2 \sin a \cos a$$

2.4 (p140) (47)

$$f(\theta) = \frac{1}{4}\sin^2 2\theta$$

$$f(\theta) = \frac{1}{4}\left(\sin 2\theta\right)^2$$

$$f'(\theta) = \frac{2}{4}\left(\sin 2\theta\right)^1 (2\cos 2\theta)$$

$$f'(\theta) = \sin 2\theta \cos 2\theta$$

$$= \frac{1}{2}(2\sin 2\theta \cos 2\theta)$$

$$f'(\theta) = \frac{1}{2}\sin 4\theta \quad \text{(double angle formula)}$$

Trig ID Review

$$\sin(a+b) = \sin a \cos b + \sin b \cos a$$

$$\sin(a+a) = \sin a \cos a + \sin a \cos a$$

$$\sin(2a) = 2\sin a \cos a$$

$$a \longmapsto 2\theta$$

$$\sin(4\theta) = 2\sin 2\theta \cos 2\theta$$

2.4 (p141) (69)

$$y = 26 - \sec^3 4x$$

Find y' when $x = 0$; confirm with calc.

$$y = 26 - \left(\frac{1}{\cos 4x}\right)^3$$

$$y' = 0 - 3\left(\frac{1}{\cos 4x}\right)^2\left(\frac{(\cos 4x)(0) - (1)(-4\sin 4x)}{(\cos 4x)^2}\right)$$

$$y' = \left(\frac{-3}{\cos^2 4x}\right)\left(\frac{+4\sin 4x}{\cos^2 4x}\right) = \frac{-12\sin 4x}{\cos^4 4x}$$

$$y' = \frac{-12\sin 4x}{\cos^4 4x}$$

$$y = \frac{(-12)(\sin 4x)}{(\cos^3 4x)(\cos 4x)}$$

$$y' = -12\sec^3 4x \tan 4x$$

$y'(0) = 0$ confirm w/ calc