

WORKSHEET #16

$$\boxed{1.} \quad * \quad f(x) = \sin^2(3x-5)$$

$$= [\sin(3x-5)]^2$$

$$f'(x) = 2 [\sin(3x-5)]^{2-1} \cdot (\sin(3x-5))'$$

by the chain rule

$$= 2 \cdot \sin(3x-5) \cdot \cos(3x-5) \cdot 3$$

$$* \quad g(x) = \sec(x^2 + 2\sqrt{x})$$

$$= \frac{1}{\cos(x^2 + 2\sqrt{x})} = [\cos(x^2 + 2\sqrt{x})]^{-1}$$

$$g'(x) = -1 [\cos(x^2 + 2\sqrt{x})]^{-2} \cdot (\cos(x^2 + 2\sqrt{x}))'$$

$$= \frac{-1}{\cos^2(x^2 + 2\sqrt{x})} \cdot -\sin(x^2 + 2\sqrt{x}) \cdot (2x + 2 \cdot \frac{1}{2\sqrt{x}})$$

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

$$* h(x) = x^3 \cdot \tan(5x^3)$$

$$h'(x) = 3x^2 \cdot \tan(5x^3) +$$

$$+ x^3 \cdot (\tan(5x^3))'$$

$$= 3x^2 \tan(5x^3) + x^3 \cdot \sec^2(5x^3) \cdot 15x^2$$

$$= \boxed{3x^2 \tan(5x^3) + 15x^5 \cdot \sec^2(5x^3)}$$

$$\boxed{2.} * f(x) = e^{\cos(2x)}$$

$$f'(x) = e^{\cos(2x)} \cdot (\cos(2x))'$$

$$= e^{\cos(2x)} \cdot (-\sin(2x) \cdot 2)$$

$$= \boxed{-2 \sin(2x) \cdot e^{\cos(2x)}}$$

$$* h(x) = e^{5x^3-2x} \cdot \cos(3x) + 4x e^{5x^3-2x}$$

$$h'(x) = (e^{5x^3-2x} \cdot 2) \cos(3x) + e^{5x^3-2x} \cdot (-\sin(3x) \cdot 3)$$

$$+ 4 e^{5x^3-2x} + 4x (e^{5x^3-2x} \cdot (15x^2 - 2))$$

$$h'(x) = 2 \cos(3x) e^{2x} - 3 \sin(3x) e^{2x} \\ + 4 e^{5x^3-2x} + 4x(15x^2-2) e^{5x^3-2x}$$

$$3. \quad f(x) = x \cos x + \sin x$$

$$f'(x) = 1 \cdot \cos(x) + x(-\sin x) + \cos(x) \\ = 2 \cos(x) - x \cdot \sin(x)$$

$$f''(x) = 2(-\sin(x)) - \sin(x) - x(\cos x) \\ = -3 \sin(x) - x \cos(x)$$