

$$(1) g(x) = 2 \cot(x)$$

$$g'(x) = -2 \csc^2(x)$$

$$(2) f(x) = \pi \csc(x)$$

$$f'(x) = -\pi \csc(x) \cot(x)$$

$$(3) y = 3x^{-4} \sec(x)$$

$$y' = -12x^{-5} \sec(x) + 3x^{-4} \sec(x) \tan(x)$$

$$y' = \frac{-12 \sec(x)}{x^5} + \frac{3 \sec(x) \tan(x)}{x^4}$$

$$(4) h(x) = 3 \sec(x) \sin(x)$$

$$h'(x) = 3 \sec(x) \tan(x) \sin(x) + 3 \sec(x) \cos(x)$$

$$h'(x) = 3 \cdot \frac{1}{\cos(x)} \cdot \frac{\sin(x)}{\cos(x)} \cdot \sin(x) + 3 \cdot \frac{1}{\cos(x)} \cdot \cos(x)$$

$$h'(x) = 3 \tan^2(x) + 3 = 3(\tan^2(x) + 1)$$

or

$$= 3 \sec^2(x)$$

$$h(x) = 3 \sec(x) \sin(x)$$

$$h(x) = 3 \cdot \frac{1}{\cos(x)} \cdot \sin(x)$$

$$h(x) = 3 \tan(x)$$

$$h'(x) = 3 \sec^2(x)$$

(5)

$$y = x^3 \cos(x)$$

$$y' = 3x^2 \cos(x) + x^3 \cdot (-\sin(x))$$

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

$$y' = \frac{x \cdot 5 \cos(x) + 5 \sin(x)}{x^2}$$

$$(7) f(x) = \cos(x) \tan(x)$$

$$f(x) = \cos(x) \cdot \frac{\sin(x)}{\cos(x)}$$

$$f(x) = \sin(x)$$

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

$$(6) y = \frac{5 \sin(x)}{x}$$

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

$$(9) y = (2x^2 - 6x) \tan(x)$$

$$y' = (4x - 6) \cdot \tan(x) + (2x^2 - 6x) \sec^2(x)$$

$$(8) g(x) = \frac{\cos(x)}{\csc(x)}$$

$$g'(x) = \frac{\csc(x) \cdot (-\sin(x)) - \cos(x) \cdot (-\csc(x) \cot(x))}{\csc^2(x)}$$

$$g'(x) = \frac{-\sin(x) + \cos(x) \cot(x)}{\csc(x)}$$