

$$5) A) f(x) = 3(x^2 + 6x)^3$$

$$v' = 3 \cdot 2x + 6 = 6x + 6,$$

$$f'(x) = 3(3x^2 + 6x)^2(6x + 6) = f'(x) = 3(9x^4 + 36x^2)(6x + 6)$$

$$B) f(x) = 3 \sin x + 2 \cos x$$

$$\frac{d}{dx} f(x) = f'(x) = 3 \cos(x) - 2 \sin(x)$$

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$$\frac{d}{dx} f(x) = 3 \cos(x) - 2 \sin(x)$$

$$C) f(x) = 2x^3 e^x - 7x^2 \cos x$$

$$f'(x) = 6x^2 e^x + 2x^3 e^x - 14x \cos x + (-7x^2)(-\sin x)$$

$$f'(x) = 6x^2 e^x + 2x^3 e^x - 14x \cos x + 7x^2 \sin x$$

$$f'(x) = 2x^2 e^x (3 + x) - 7x(2 \cos x - x \sin x)$$

$$d) f(x) = \frac{x^2 + 3x}{e^x} = f'(x) = \frac{(2x + 3) \cdot e^x - (x^2 + 3x) \cdot e^x}{(e^x)^2}$$

$$f'(x) = \frac{(2x + 3) e^x - (x^2 + 3x) e^x}{(e^x)^2}$$

$$f'(x) = \frac{-x^2 e^x - x e^x + e^x 3}{(e^x)^2}$$

$$f'(x) = \frac{e^x (-x^2 - x + 3)}{(e^x)^2} = f'(x) = \frac{-x^2 - x + 3}{e^x}$$

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$$\cancel{f(x) = (2x + 3)e^x} \quad f'(x) = \frac{e^x \cdot 2x + e^x \cdot 3 - e^x x^2 - e^x 3x}{(e^x)^2}$$

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