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HW: RULES OF DIFFERENTIATION: Exponential function



M.P

① $f(x) = \sqrt{2x + e^{10x}}$
 $f'(x) = (2x + e^{10x})^{-1/2}$

$f'(x) = \frac{1}{2} (2x + e^{10x})^{-1/2} (2 + 10e^{10x})$

$f'(x) = (2 + 10e^{10x}) \frac{1}{2(2x + e^{10x})^{1/2}}$

$f'(x) = \frac{2 + 10e^{10x}}{2\sqrt{2x + e^{10x}}}$

⑤ $y = \frac{3}{e^{2x^2}}$

$y' = (e^{2x^2})^{-3} (-3e^{-2x^2})$

$y' = -3e^{-6x^2} (4x e^{2x^2})$

$y' = \frac{-12x e^{2x^2}}{e^{6x^2}} = \frac{-12x}{e^{4x^2}}$

② $f(x) = 4e^{x/2} + \frac{5}{2x^2}$

$f'(x) = 2e^{x/2} - \frac{10}{2x^3}$

$f'(x) = 2e^{x/2} - \frac{5}{x^3}$

⑥ $y = \frac{e^{x^2}}{2x}$

$y' = \frac{(2x^2 e^{x^2} - 2e^{x^2})}{2(2x^2 e^{x^2} - 1e^{x^2})}$

$y' = \frac{e^{x^2} (2x^2 - 1)}{2x^2}$

③ $f(x) = \frac{2x^3}{e^{2x}}$

$f'(x) = \frac{(e^{2x} 6x^2) - (2x^3 2e^{2x})}{e^{4x}}$

$f'(x) = \frac{2(3x^2 e^{2x} - 2x^3 e^{2x})}{e^{4x}}$

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

④ $y = x^4 (e^{1-2x})$

$y' = x^4 (-2e^{1-2x}) + (e^{1-2x}) (4x^3)$

$y' = -2x^4 e^{1-2x} + 4x^3 e^{1-2x}$

$y' = (-x + 2) 2x^3 e^{1-2x}$

⑦ $y = e^{3x} (2x - 1)^4$

$y' = (3e^{3x}) (4x) (2x - 1)^3$

$y' = 12e^{3x} (2x - 1)^3$

$y' = e^{3x} (6x + 5) (2x - 1)^3$

⑧ $f(x) = \frac{e^{2x}}{6} + 2x^5$

$f'(x) = \frac{1}{3} e^{2x} + 10x^4$

$f'(x) = \frac{e^{2x}}{3} + 10x^4$