① Product Rule

$f(x) = (x+2)(x+3)$

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

$f'(x) = 2x+5$

$f'(x) = (x+2)(1)+(x+3)(1)$

$= x+2+x+3$

$= 2x+5$

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② General Power Rule

$f(x) = (x+3)^2$

$f(x) = x^2+6x+9$

$f'(x) = 2x+6$

$f'(x) = 2(x+3)(1)$

$f'(x) = 2x+6$

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③ Quotient Rule

$f(x) = \frac{x^2+x}{x}$

$f(x) = \frac{x(x+1)}{x}$

$f(x) = x+1$

$f'(x) = 1$

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

$= \frac{2x^2+x-x^2-x}{x^2}$

$= \frac{x^2}{x^2}$

$= 1$

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shortened it for practice

$\frac{dy}{dx}$

⑦ x^3y^2 ~~$+ 3x^2y + 4xy^{-1} + 2y^{-2}$~~

$x^3(2y)\frac{dy}{dx} + y^2(3x^2) = 2x^3y\frac{dy}{dx} + 3x^2y^2$

⑧ longer one