AP Calculus Sec 2.3

The Product Rule

$$\frac{d}{dx}\left[f(x)g(x)\right] = f(x)g'(x) + f'(x)g(x)$$

(1st)(d 2nd) + (d 1st)(2nd)

ex. $f(x) = (x^2 - 2x + 1)(x^3 - 1)$

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

$= 3x^4 - 6x^3 + 3x^2 + 2x^4 - 2x - 2x^3 + 2$

$= 5x^4 - 8x^3 + 3x^2 - 2x + 2$

ex. $y = x \sin x + \cos x$

$y' = [x \cdot \cos x + 1 \cdot \sin x] - \sin x$

$y' = x\cos x + \sin x - \sin x$

$y' = x\cos x$

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