

Quiz 4

Find the derivative of the function

$$f(x) = (x^3 - 12x)(x^2 - 4x + 3).$$

Express your answer in standard polynomial form. Show all your work.

Solution. Use the product rule to get

$$\begin{aligned} f'(x) &= \left(\frac{d}{dx}x^3 - 12x\right)(x^2 - 4x + 3) + \left(\frac{d}{dx}x^2 - 4x + 3\right)(x^3 - 12x) \\ &= (3x^2 - 12)(x^2 - 4x + 3) + (2x - 4)(x^3 - 12x) \\ &= 3x^4 - 12x^3 - 12x^2 + 48x - 36 + 2x^4 - 4x^3 - 24x^2 + 48x \\ &= 5x^4 - 16x^3 - 36x^2 + 96x - 36 \end{aligned}$$