

SUM RULE

The sum rule states that if two or more terms are added or subtracted then their derivatives can be found by applying the power rule to each term individually. Refresh your knowledge on the power rule before this.

DIFFERENTIATE $x^4 + 3x^5 - 2x^7$

The exponent is simply brought to the position of the co-efficient (and multiplied by the co-efficient if there was a co-efficient in front of the term) and one is subtracted from the exponent. This is done for all terms in this equation.

$$f(x) = x^4 + 3x^5 - 2x^7$$

Simplification can then occur across this function by simply performing the operations mentioned.

$$f'(x) = (4 * 1)x^{4-1} + (5 * 3)x^{5-1} - (2 * 7)x^{7-1}$$

$$f'(x) = 4x^3 + 15x^4 - 14x^6$$

This also works for functions with surds and equations too. An example involving fractions is below:

$$f(x) = x^{\frac{7}{2}} - 4x^{\frac{5}{4}} + \sqrt{2}x^{\sqrt{\frac{5}{4}}}$$

$$f'(x) = \frac{7}{2}x^{\frac{7}{2}-1} - (\frac{5}{4} * 4)x^{\frac{5}{4}-1} + (\sqrt{\frac{5}{4}} * \sqrt{2})x^{\sqrt{\frac{5}{4}}-1}$$

$$f'(x) = \frac{7}{2}x^{\frac{5}{2}} - 5x^{\frac{1}{4}} + (\sqrt{\frac{5}{4}} * \sqrt{2})x^{\sqrt{\frac{5}{4}}-1}$$