Quotient Rule: If $y = \dfrac{f(x)}{g(x)}$ then $y' = \dfrac{g(x) \cdot f'(x) - f(x) \cdot g'(x)}{[g(x)]^2}$.

$\Big\{$ *The derivative of the quotient of two functions is the denominator times the derivative of the numerator minus the numerator times the derivative of the denominator all divided by the square of the denominator.*

a) If $y = \dfrac{5x^3 - 1}{x^5 + x^2 - 7}$ find y' .

$$y' = \frac{\left(x^5 + x^2 - 7\right)15x^2 - \left(5x^3 - 7\right)\left(5x^4 + 2x\right)}{\left(x^5 + x^2 - 7\right)^2}$$

b) If $y = \dfrac{x^2 e^x + x \ln x}{x^4 + 7}$ find $\dfrac{dy}{dx}$.

$$y' = \frac{\left(x^4 + 7\right)\left[x^2 \cdot e^x + e^x \, \partial x + x \cdot \frac{1}{x} + \ln x\right] - \left(x^2 e^x + x \ln x\right)\left(4x^3\right)}{\left(x^4 + 7\right)^2}$$.