Implicit Differentiation - part 2

Find $\frac{d^2y}{dx^2}$ for $6x^3 - 7y + 2y^3 = 9x$

$$18x^2 - 7y' + 6y^2y' = 9$$

$$-7y' + 6y^2y' = 9 - 18x^2$$

$$y'(-7 + 6y^2) = 9 - 18x^2$$

$$y' = \frac{9 - 18x^2}{-7 + 6y^2}$$ ← this is the 1st derivative, we will be using this

Quotient Rule to find 2nd der.

$$y'' = \frac{(-36x)(-7 + 6y^2) - (9 - 18x^2)(12y)y'}{(-7 + 6y^2)^2}$$

substitute for y'

$$y'' = \frac{(-36x)(-7 + 6y^2) - (9 - 18x^2)(12y)\left(\frac{9 - 18x^2}{-7 + 6y^2}\right)}{(-7 + 6y^2)^2}$$

$$y'' = \frac{(-36x)(-7 + 6y^2) - \frac{(12y)(9 - 18x^2)^2}{-7 + 6y^2}}{(-7 + 6y^2)^2}$$

no point in distributing or foiling b/c there would <u>not</u> be any like terms (check variables and their exponents)