Simplify an algebraic expression:$(3x-1)(x^2+4x-4)$

Solution:

When simplifying expressions with parentheses, we will be applying the distributive property. This mean, that we will be distributed over (multiplying through) a set of parentheses in order to simplify a given expression. Here are the basic steps to follow to simplify an algebraic expression:

- remove parentheses by multiplying factors;
- use exponent rules to remove parentheses in terms with exponents;
- combine like terms by adding coefficients;
- combine the constants.

In our case we use the distributive property to clear parentheses, by multiplying the factors times the terms inside the parentheses:

$$(3x-1)(x^2+4x-4) = 3x^3+12x^2-12x-x^2-4x+4$$

When a term with an exponent is raised to a power, we multiply the exponents, so $(x^2)x$ becomes x^3.

The next step in simplifying is to look for like terms and combine them. The terms $-12x$ and $-4x$ are like terms, because they have the same variable raised to the same power - namely, the first power, since the exponent is understood to be 1. We can combine these two terms to get $-16x$. The terms $12x^2$ and $-x^2$ are like terms, because they have the same variable raised to the same power - namely, the second power, so we combine them to get $11x^2$.

$$3x^3+\underline{12x^2}-\underline{\underline{12x}}-\underline{x^2}-\underline{\underline{4x}}+4$$

Using the commutative property of addition, we can rearrange the terms and put this expression in correct order, like this:

$$3x^3+11x^2-16x+4$$