Completing the Square in a Quadratic Expression

A **Quadratic Expression** is one which is of the form ax^2+bx+c where x is a variable and a, b and c are constants such that a must not be equal to 0.

ADDING OR SUBTRACTING A NUMBER TO COMPLETE THE SQUARE

Example:

$2x^2-8x-192=0$ cannot be perfectly factorized. The expression is of the quadratic equation's form ax^2+bx+c and the equation must be divided by a=2 to solve it easily. Dividing $2x^2-8x-192=0$ by 2 will give: $x^2-4x-96=0$

So, $x^2-2(2)(x)+(2)^2-96 = (2)^2$ $(2)^2$ must both be added to both sides of the equation.

$$(x-2)^2 = 4+96 \quad \rightarrow \quad (x-2)^2 = 100$$

FILLING THE BLANK TO COMPLETE THE SQUARE

Example:

$3x^2-36x+$_____. The given expression is a quadratic expression of the form ax^2+bx+c

To complete the square of the given expression, divide the whole expression by a=3 for solving the expression easily. Dividing $3x^2-36x$ will give: x^2-12x.

$x^2-12x = x^2-2(6)x+(6)^2$

$\quad = (x-6)^2$ $(6)^2=36$ have been added to x^2-12x to make it a perfect square.

So, $36\times3=108$ should be added to $3x^2-36x$ to make it a perfect square.

Meets: Common Core Standard High School – HSA-SSE.B.3b