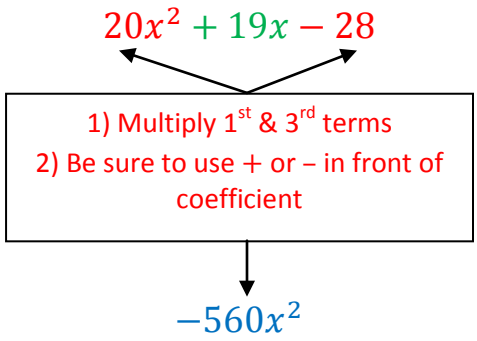
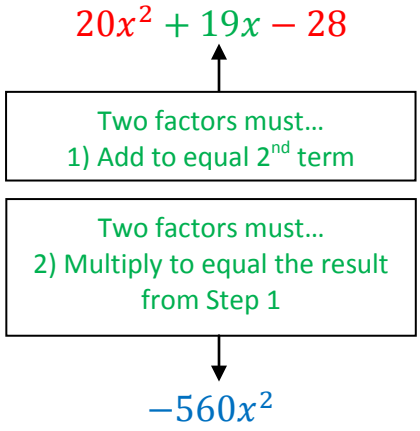
Example 2

Factor $20x^2 + 19x - 28$

Step 1- Multiply the 1st term and 3rd term and write down the result. Be sure to pay attention to whether the result is positive or negative.



Step 2- Find two factors that will multiply to equal our new coefficient. These two factors must add to equal the 2nd term coefficient.

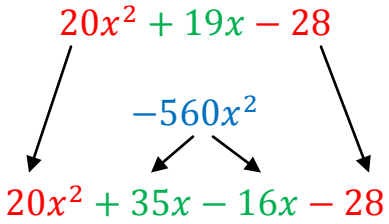


We need two factors with a product of $-560x^2$ that also have a sum of $+19x$.

$$(+20x) \bullet (-28x) = -560x^2 \quad \text{and} \quad (+20x) + (-28x) = -8x$$
$$(+28x) \bullet (-20x) = -560x^2 \quad \text{and} \quad (+28x) + (-20x) = +8x$$
$$(+40x) \bullet (-14x) = -560x^2 \quad \text{and} \quad (+40x) + (-14x) = +26x$$
$$(+35x) \bullet (-16x) = -560x^2 \quad \text{and} \quad (+35x) + (-16x) = +19x$$

We found them! $(+35x)$ & $(-16x)$ are what we need!

Step 3- Write the two factors we found in Step 2 in the middle. On the outside, bring down the original 1st & 3rd terms.



Step 4- Factor by grouping to get the final answer.

$$20x^2 + 35x - 16x - 28$$
$$(20x^2 + 35x) + (-16x - 28)$$
$$5x(4x + 7) + -4(4x + 7)$$
$$(5x - 4)(4x + 7)$$

Step 5 (Optional)- Use FOIL to check your answer.

$$(5x - 4)(4x + 7) = 20x^2 + 35x - 16x + 28 = 20x^2 + 19x + 28$$

$$\boxed{(\mathbf{5x - 4})(\mathbf{4x + 7})}$$