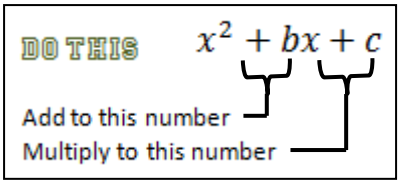
Factoring $x^2 + bx + c$

How To: Find two numbers that multiply to equal the number 'c' that also add to the number 'b' at the same time. Write your answer as $(x + \_\_)(x + \_\_)$ … Keep in mind, the + may change to – if numbers are negative.



Example #1: Factor $x^2 + 5x + 6$

Solution:
1. Find two numbers that multiply to 6 and add to 5.
2. The two numbers are 2 and 3.
3. Write your solution: $(x + 2)(x + 3)$

Example #2: Factor $x^2 + 3x - 28$

Solution:
1. Find two numbers that multiply to – 28 and add to 3.
2. The two numbers are 7 and – 4.
3. Write your solution: $(x + 7)(x - 4)$

Example #3: Factor $x^2 - 4x - 45$

Solution:
1. Find two numbers that multiply to – 45 and add to – 4.
2. The two numbers are – 9 and 5.
3. Write your solution: $(x - 9)(x + 5)$

Example #3: Factor $x^2 - 6x + 8$

Solution:
1. Find two numbers that multiply to 8 and add to – 6.
2. The two numbers are – 2 and – 4.
3. Write your solution: $(x - 2)(x - 4)$

Time to practice… Factor the following on your own:

1. $x^2 + 11x + 24$ Solution =
2. $x^2 - 11x + 30$ Solution =
3. $x^2 + 4x - 12$ Solution =
4. $x^2 - 2x - 63$ Solution =
5. $x^2 - x - 12$ Solution =
6. $x^2 + 10x + 16$ Solution =
7. $x^2 + 3x - 18$ Solution =
8. $x^2 - 13x + 42$ Solution =

Factoring $x^2 + bx + c$

ANSWER KEY

1. $(x + 8)(x + 3)$ OR $(x + 3)(x + 8)$
2. $(x - 6)(x - 5)$ OR $(x - 5)(x - 6)$
3. $(x + 6)(x - 2)$ OR $(x - 2)(x + 6)$
4. $(x - 9)(x + 7)$ OR $(x + 7)(x - 9)$
5. $(x - 4)(x + 3)$ OR $(x + 3)(x - 4)$
6. $(x + 2)(x + 8)$ OR $(x + 8)(x + 2)$
7. $(x + 6)(x - 3)$ OR $(x - 3)(x + 6)$
8. $(x - 7)(x - 6)$ OR $(x - 6)(x - 7)$