

Example 1 – Factor $x(x + 5) + 7(x + 5)$

Step 1- Identify for the repeating factor

Which factor appears in both terms?

$$x(x + 5) + 7(x + 5)$$

Step 2 – Factor out what repeats; put what is leftover in its own set of parentheses.

$$(x + 5)(x + 7)$$

Repeating factor

Leftover stuff

$$(x + 5)(x + 7)$$

Example 2 – Factor $10m(m - 8) - (m - 8)$

Step 1- Identify for the repeating factor

Which factor appears in both terms?

$$10m(m - 8) - 1(m - 8)$$

We know there is a 1 here, so we'll write it!

Step 2 – Factor out what repeats; put what is leftover in its own set of parentheses.

$$(m - 8)(10m - 1)$$

Repeating factor

Leftover stuff

$$(m - 8)(10m - 1)$$

YOU – Factor $3c(c + 8) - 11(c + 8)$

When we see a four-term polynomial, a good factoring strategy may be **factoring by grouping**.

Example 3 – Factor $10c^2 - 5c + 2cd - d$

Step 1 – Make two groups of two terms with a + operator between them (look for common factors within each group).

$$10c^2 - 5c + 2cd - d$$

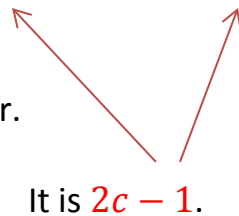
$$(10c^2 - 5c) + (2cd - d)$$

Step 2 – Factor out the GCF for both groups (we hope to end up with the same thing in both sets of parentheses).

$$(10c^2 - 5c) + (2cd - d)$$

$$5c(2c - 1) + d(2c - 1)$$

Step 3 – Identify the repeating factor.



It is $2c - 1$.

Step 4 – Factor out what repeats; put what is leftover in its own set of parentheses.

$$(2c - 1)(5c + d)$$

$(2c - 1)(5c + d)$

YOU - Factor $8w^2 - 36wy + 6w - 27y$

Example 3 – Factor $12x^2 + 21xy - 20x - 35y$

Step 1 – Make two groups of two terms with a + operator between them (look for common factors within each group).

$$12x^2 + 21xy - 20x - 35y$$

$$(12x^2 + 21xy) + (-20x - 35y)$$

Step 2 – Factor out the GCF for both groups (we hope to end up with the same thing in both sets of parentheses).

$$(12x^2 + 21xy) + (-20x - 35y)$$

$$3x(4x - 7) + -5(4x - 7)$$

$$3x(4x - 7) - 5(4x - 7)$$

Step 3 – Identify the repeating factor.

It is $4x - 7$.

Step 4 – Factor out what repeats; put what is leftover in its own set of parentheses.

$$(4x - 7)(3x - 5)$$

$$(4x - 7)(3x - 5)$$

TIP: If you get the opposite of what you want, you may need to factor -1 .

$$(4x - 3) = -1(3 - 4x)$$