GCSE Maths – Algebra

Collecting Like Terms

Worksheet

WORKED SOLUTIONS

This worksheet will show you how to work out different types of collecting like terms questions. Each section contains a worked example, a question with hints and then questions for you to work through on your own.

Section A

Worked Example

Simplify the expression $7x + 8y - 9x + 3x^2 + 2y - 10$

Step 1: Identify the 'like terms' to make it clear which terms we can combine.

$$7x + 8y - 9x + 3x^2 + 2y - 10$$

Here, we have four types of terms: the 'x' term, the 'y' term, the 'x^2' term and the constant term.

Step 2: Rearrange the expression so the like terms can be placed together.

$$+7x - 9x + 8y + 2y + 3x^2 - 10$$

***Remember** to include the invisible + sign that is front of the first term, i.e., the '$7x$' in this example.*

Step 3: Combine the like terms by summing them together.

$$+7x - 9x + 8y + 2y + 3x^2 - 10$$
$$\Rightarrow -2x + 10y + 3x^2 - 10$$

So, the final answer is $-2x + 10y + 3x^2 - 10$

Guided Example

Simplify the expression $6a + 5ba + 17b + 10 + 7a^3 - 10a + 3ab - a^3$

Step 1: Identify the 'like terms' to make it clear which terms we can combine.

$6a + 5ba + 17b + 10 + 7a^3 - 10a + 3ab - a^3$

Step 2: Rearrange the expression so the like terms can be placed together.

$6a - 10a + 5ba + 3ab + 7a^3 - a^3 + 17b + 10$

$5ba = 5ab$

Step 3: Combine the like terms by summing them together.

$-4a + 8ab + 6a^3 + 17b + 10$

Now it's your turn!
If you get stuck, look back at the worked and guided examples.

1. Simplify the following algebraic expressions:

a) $5p + 7q + 10 + 15p - 7q + 8t - 3$

$5p + 7q + 10 + 15p - 7q + 8t - 3$
$5p + 15p + 7q - 7q + 10 - 3 + 8t$
$20p + 7 + 8t$
$20p + 7 + 8t$

The q terms have been eliminated.

b) $16 + 8d + 9e - 82 + 7de + 5 - d$

$16 + 8d + 9e - 82 + 7de + 5 - d$
$16 + 5 - 82 + 8d - d + 9e + 7de$
$-61 + 7d + 9e + 7de$
$-61 + 7d + 9e + 7de$

c) $92 + 7ab + 16 + 8abc + 9ab - bc$

$92 + 7ab + 16 + 8abc + 9ab - bc$
$92 + 16 + 7ab + 9ab + 8abc - bc$
$108 + 16ab + 8abc - bc$
$108 + 16ab + 8abc - bc$

d) $34ab + 17 + 52ab + 18ab^2 + 62 + 19a^2b$

$34ab + 17 + 52ab + 18ab^2 + 62 + 19a^2b$
$34ab + 52ab + 17 + 62 + 18ab^2 + 19a^2b$
$86ab + 79 + 18ab^2 + 19a^2b$
$86ab + 79 + 18ab^2 + 19a^2b$

e) $62xy + 17xyz + 64 + xy - 18xyz + 9y + 21 + 92yz$

$62xy + 17xyz + 64 + xy - 18xyz + 9y + 21 + 92yz$
$62xy + xy + 17xyz - 18xyz + 64 + 21 + 9y + 92yz$
$63xy - xyz + 85 + 9y + 92yz$
$63xy - xyz + 85 + 9y + 92yz$

f) $x^2 - xy^2 + xy - y^2 + 1 - x^2 + yx$

NOTE: $yx = xy$

$x^2 - xy^2 + xy - y^2 + 1 - x^2 + xy$
$x^2 - x^2 + xy + xy - xy^2 - y^2 + 1$
$2xy - xy^2 - y^2 + 1$
$2xy - xy^2 - y^2 + 1$

g) $23 - a + b - ab + b^2 - a^2b^2 - 2a - (3ab)^2$

$(3ab)^2 = 3^2a^2b^2 = 9a^2b^2$

$23 - a + b - ab + b^2 - a^2b^2 - 2a - (3ab)^2$
$23 - a + b - ab + b^2 - a^2b^2 - 2a - 9a^2b^2$
$23 - a - 2a - a^2b^2 - 9a^2b^2 + b - ab + b^2$
$23 - 3a - 10a^2b^2 + b - ab + b^2$
$23 - 3a - 10a^2b^2 + b - ab + b^2$