

## COMBINING LIKE TERMS

#2

**Like terms** are algebraic expressions with the same variables and the same exponents for each variable. Like terms may be combined by performing addition and/or subtraction of the coefficients of the terms. Also see the textbook, page 57.

### Example 1

$(3x^2 - 4x + 3) + (-x^2 - 3x - 7)$  means combine  $3x^2 - 4x + 3$  with  $-x^2 - 3x - 7$ .

1. To combine horizontally, reorder the six terms so that you can add the ones that are the same:  $3x^2 - x^2 = 2x^2$  and  $-4x - 3x = -7x$  and  $3 - 7 = -4$ . The sum is  $2x^2 - 7x - 4$ .

2. Combining vertically:

$$\begin{array}{r} 3x^2 - 4x + 3 \\ -x^2 - 3x - 7 \\ \hline 2x^2 - 7x - 4 \end{array}$$

is the sum.

### Example 2

Combine  $(x^2 + 3x - 2) - (2x^2 + 3x - 1)$ .

First apply the negative sign to each term in the second set of parentheses by distributing (that is, multiplying) the  $-1$  to all three terms.

$$-(2x^2 + 3x - 1) \Rightarrow (-1)(2x^2) + (-1)(3x) + (-1)(-1) \Rightarrow -2x^2 - 3x + 1$$

Next, combine the terms. A complete presentation of the problem and its solution is:

$$\begin{aligned} (x^2 + 3x - 2) - (2x^2 + 3x - 1) &\Rightarrow x^2 + 3x - 2 - 2x^2 - 3x + 1 \\ &\Rightarrow -x^2 + 0x - 1 \Rightarrow -x^2 - 1. \end{aligned}$$

Combine like terms for each expression below.

1.  $(x^2 + 3x + 4) + (x^2 + 4x + 3)$
2.  $(2x^2 + x + 3) + (5x^2 + 2x + 7)$
3.  $(x^2 + 2x + 3) + (x^2 + 4x)$
4.  $(x + 7) + (3x^2 + 2x + 9)$
5.  $(2x^2 - x + 3) + (x^2 + 3x - 4)$
6.  $(-x^2 + 2x - 3) + (2x^2 - 3x + 1)$
7.  $(-4x^2 - 4x - 3) + (2x^2 - 5x + 6)$
8.  $(3x^2 - 6x + 7) + (-3x^2 + 4x - 7)$
9.  $(9x^2 + 3x - 7) - (5x^2 + 2x + 3)$
10.  $(3x^2 + 4x + 2) - (x^2 + 2x + 1)$
11.  $(3x^2 + x + 2) - (-4x^2 + 3x - 1)$
12.  $(4x^2 - 2x + 7) - (-5x^2 + 4x - 8)$
13.  $(-x^2 - 3x - 6) - (7x^2 - 4x + 7)$
14.  $(-3x^2 - x + 6) - (-2x^2 - x - 7)$
15.  $(4x^2 + x) - (6x^2 - x + 2)$
16.  $(-3x + 9) - (5x^2 - 6x - 1)$
17.  $(3y^2 + x - 4) + (-x^2 + x - 3)$
18.  $(5y^2 + 3x^2 + x - y) - (-2y^2 + y)$
19.  $(x^3 + y^2 - y) - (y^2 + x)$
20.  $(-3x^3 + 2x^2 + x) + (-x^2 + y)$

## Answers

1.  $2x^2 + 7x + 7$
2.  $7x^2 + 3x + 10$
3.  $2x^2 + 6x + 3$
4.  $3x^2 + 3x + 16$
5.  $3x^2 + 2x - 1$
6.  $x^2 - x - 2$
7.  $-2x^2 - 9x + 3$
8.  $-2x$
9.  $4x^2 + x - 10$
10.  $2x^2 + 2x + 1$
11.  $7x^2 - 2x + 3$
12.  $9x^2 - 6x + 15$
13.  $-8x^2 + x - 13$
14.  $-x^2 + 13$
15.  $-2x^2 + 2x - 2$
16.  $-5x^2 + 3x + 10$
17.  $3y^2 - x^2 + 2x - 7$
18.  $7y^2 + 3x^2 + x - 2y$
19.  $x^3 - y - x$
20.  $-3x^3 + x^2 + x + y$