

**The Distributive Law**

**Part A Collect the like terms**

- $3x+2+2x+5 = 5x+7$
- $4x+5-3x-2 = x+3$
- $2x+3-5x+1 = -3x+4$
- $x-4x-3+5 = -3x+2$
- $3x-5-2x+3 = x-2$
- $-4+2x-3-4x = -2x-7$
- $3x-2-x+3-5-2x = -4$
- $4-3x-1+x-3+2x = 0$

**Part B Distributing a "-" sign**

$-(3x-5) = -3x+5$  Notice the - sign is applied to each term inside the brackets.

To simplify

$$\begin{aligned} & (3x-7)-(2x+8) \\ &= 3x-7-2x-8 \\ &= x-15 \end{aligned}$$

Simplify the following:

- $(2x+3)-(x+5) = x-2$
- $(4x-4)-(-2x-3) = 6x-1$
- $-(2x+1)+(3x+4) = x+3$
- $-(3x-2)-(-2x-1) = -x+3$
- $(-4x+3)-(2x-3) = -6x+6$
- $(2x+3)-(3x-2)-(x+4) = -2x+1$
- $5x-(4x+2)-(3-2x) = 3x-5$

**Part C Expanding using the Distributive Law.**

The distributive law says

$$a(b+c) = ab+ac$$

$$a(b-c) = ab-ac$$

So  $7(x+y) = 7x+7y$  and  $2(3x+4y) = 6x+8y$

Expand each expression below:

- $5(k+1) = 5k+5$
- $2(3-2w) = 6-4w$
- $4(2m+1) = 8m+4$
- $-1(4+5y) = -4-5y$
- $-3(2-p) = -6+3p$
- $3(1-3b) = 3-9b$
- $-2(4r-5) = -8r+10$
- $-4(2s+2) = -8s-8$
- $6(2.5y-9.3) = 15y-55.8$
- $1.4(2x+7.5) = 2.8x+10.5$
- $9(6.8x-3.1) = 61.2x-27.9$
- $\frac{1}{2}(6+8z) = 3+4z$
- $3(x+2y-7) = 3x+6y-21$
- $-2(a-5b+2) = -2a+10b-4$
- $4(9p+q-9r) = 36p+4q-36r$
- $5(x+6y-4) = 5x+30y-20$

**Part D To simplify with more than one set of brackets.**

$$\begin{aligned} & 3(2x+5y)+7(4x-2y) \\ &= 6x+15y+28x-14y \\ &= 34x+y \end{aligned}$$

expand first  
collect like terms

$$\begin{aligned} & 6h-(3h-4)-12h \\ &= 6h-3h+4-12h \\ &= -9h+4 \end{aligned}$$

expand first  
collect like terms

$$\begin{aligned} & -5(3m+6n)-8(9m-2n) \\ &= -15m-18n-72m+16n \\ &= -87m-2n \end{aligned}$$

expand first  
collect like terms

Complete the following in your notebook:

- $3x+2(5x-7) = 13x-14$
- $9-3(2x-4) = 21-6x$
- $8x-6(3-2x) = 10x-18$
- $-5+5(x+4) = 5x+15$
- $4(6x+9)-10x = 14x+36$
- $14-3(4n-1) = -12n+17$
- $-8n-8(-4-2n) = 8n+32$
- $7n-2(3n+1)-9 = n-11$
- $-6+5(8-n)-8n = -13n+32$
- $7(2p-1)+5(3-4p) = -6p+8$
- $-5(-2p+7)-3(5-9p) = 37p-50$

# Lesson 1

## ALGEBRA - Terms and Collecting

P1

1. State the numerical coefficient (nc) and literal coefficient (lc) of each term.

- a)  $15y$     nc = 15    lc = y
- b)  $-6x$     nc = -6    lc = x
- c)  $5x^2$     nc = 5    lc =  $x^2$
- d)  $\frac{2}{3}y^2$     nc =  $\frac{2}{3}$     lc = y
- e)  $m$     nc = 1    lc = m
- f)  $-n^2$     nc = -1    lc =  $n^2$
- g)  $-10n^3m^2k$     nc = -10    lc =  $n^3m^2k$
- h)  $\frac{1x}{4}$     nc =  $\frac{1}{4}$     lc = x
- i)  $\frac{k}{6}$     nc =  $\frac{1}{6}$     lc = k
- j)  $\frac{7}{8}$     nc =  $\frac{7}{8}$     lc = 1
- k)  $\frac{4y}{5}$     nc =  $\frac{4}{5}$     lc = y
- l)  $\frac{-3m^2n}{4}$     nc =  $-\frac{3}{4}$     lc =  $m^2n$

2. Simplify each expression.

- a)  $10x + \frac{4x}{14x}$     c)  $12y - \frac{8y}{4y}$
- b)  $10x + 4x = 14x$     d)  $12y - 8y = 4y$
- e)  $\frac{-8y}{4y} + \frac{12y}{4y}$     h)  $7m + (-4m) = 3m$
- f)  $-8y + 12y = 4y$
- i)  $15x - 20x = -5x$
- j)  $-6m - 3m = -9m$
- k)  $15x - 20x = -5x$
- l)  $-4m + 7m = 3m$
- m)  $-8n + 5n - 2n + 7n = 2n$
- n)  $3k - 10k - 10k + 17k = 0$

3. Simplify each expression.

- a)  $5x + 3y - 2x - 2y = 3x + y$
- b)  $10m - 5k - 3m + 6k = 7m + k$
- c)  $8x - 4y + 2x - 5y = 10x - 9y$
- d)  $-5x + 6y + 3x - 4y = -2x + 2y$
- e)  $-3x - 3y + 5x + 6y = 2x + 3y$
- f)  $-4a + 10m - 3a - 7m = -7a + 3m$
- g)  $4x - 7x + 6y - 5y = -3x + y$
- h)  $10k - 9k - 8m + 9m = k + m$
- i)  $-9k + 10k + 9m - 8m = k + m$
- j)  $-4x - 3y - 2x - 5y = -6x - 8y$

k)  $10x + (-3x) = 7x$

l)  $15x - (-5x) = 20x$

m)  $-4m + (-3m) = -7m$

n)  $-2m - (-3m) = m$

o)  $4x - (-2x) + 3y + (-2y) = 6x + y$

p)  $5x - (-5x) + 4y - (-4y) = 10x + 8y$

q)  $10m + (-3m) - 2x + (-2x) = 7m - 4x$

r)  $-4x - (-3x) - 5y - (-4y) = -x - y$

P3