Simplifying Expressions

Equivalent Expressions

- A different (but equal) version of an expression. It can often be found by simplifying!
- To simplify, we collect like terms. That is, terms that have the same variable and same exponent.

Ex/ Simplify by collecting like terms.

a) $3x+2x$

$=5x$

b) $2y-3y-4$

$=-1y-4$

c) $-2x+3y+5x-2y$

$=3x+y$

same exponents

d) $a-2c+3a-b-5c$

$=4a-b-7c$

e) $3x^2-5x+4x-x^2$

$=2x^2-x$

f) $4x^2+3x-7x^2+8x-x-7x^2$

$=-10x^2+10x$

g) $-10+r+r+5$

$=2r-5$

h) $4x+7y-3y-4x$

$=4y$ No x's left

Distributive Property

- Multiply the term outside the brackets with whatever terms are inside the brackets. When we use the distributive property, it is called expanding.

Ex/ Expand and simplify.

a) $3(x+6)$

$=3x+18$

b) $-4(4y+1)$

$=-16y-4$

c) $-2(3x-2y)$

$=-6x+4y$

d) $3w(2w+4)$

letters multiply with same letter → add exponents

$=6w^2+12w$

e) $-(8k+7)$

Negative one (changes signs)

$=-8k-7$

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

$=-20x^2+12x$

- The distributive property can be combined with the other operations between polynomials.

Ex/ Simplify

a) $5(3y+7)+4(6y-1)$

$=15y+35+24y-4$

collect like terms

$=39y+31$

b) $4(2x+1)-2(x-5)$

$=8x+4-2x+10$

$=6x+14$

c) $2(3w-5)-4(6+2w)$

$=6w-10-24-8w$

$=-2w-34$

d) $3x+(4-9x)$

$=3x+4-9x$

$=-6x+4$

e) $2(-2y+7)-(3y-8)$

$= -4y + 14 - 3y + 8$

$= -7y + 22$

f) $(b+5-2b^2)-2(1-2b-b^2)$

$= b + 5 - 2b^2 - 2 + 4b + 2b^2$

$= 5b + 3$

g) $-3x+3(x+2)$

$= -3x + 3x + 6$

$= 6$

h) $25m-2(4m-1)$

$= 25m - 8m + 2$

$= 17m + 2$

i) $3x+2-2(x+4)+6$

$= 3x + 2 - 2x - 8 + 6$

$= x$

j) $2(4y-3)-5(y+6)+2(4-3y)$

$= 8y - 6 - 5y - 30 + 8 - 6y$

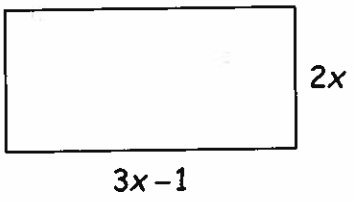
$= -3y - 28$

k) $2(x-5)+4(-2x+5)-3x+4-5(x+2)$

$= 2x - 10 - 8x + 20 - 3x + 4 - 5x - 10$

$= -14x + 4$

Ex/ a) Find a simplified expression for the perimeter and area of the rectangle given below.
b) Determine the perimeter and area if $x = 7$ cm.



a) $P = 2(3x-1) + 2(2x)$

$= 6x - 2 + 4x$

$= 10x - 2$

$A = 2x(3x-1)$

$= 6x^2 - 2x$

b) $P = 10(7) - 2$

$= 68$ cm

$A = 6(7)^2 - 2(7)$

$= 6(49) - 2(7)$

$= 144 - 14$

$= 130$ cm^2

Homework: Simplifying Expressions