Name: _____ Date: _____

Learning Goal 5.3	I can multiply and divide polynomials.

Recall the area model for multiplying and dividing polynomials by a constant.

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

$= -6x^2 + 9x - 6$

↑ area

$\frac{6x^2 - 9x + 6}{-3}$ ← area; one side length

$= -2x^2 + 3x - 2$

↑ second side length

The same rules apply if that constant is replaced with a monomial (a one term polynomial).

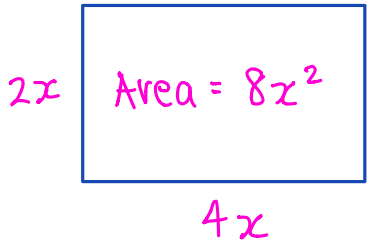
Example Expand and simplify, if possible.

a. $2x(4x)$

$= 2 \cdot 4 \cdot x \cdot x$

$= 8x^2$

monomial

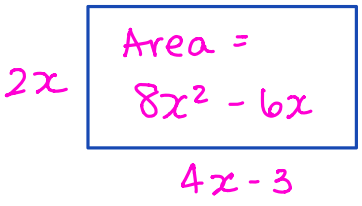


b. $2x(4x - 3)$

binomial

$= (2 \cdot 4 \cdot x \cdot x) - (2 \cdot 3 \cdot x)$

$= 8x^2 - 6x$



c. $2x(x^2 + 4x - 3)$

$= (2 \cdot x \cdot x^2) + (2 \cdot 4 \cdot x \cdot x) - (2 \cdot 3 \cdot x)$

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

Example Simplify where possible.

a. $\frac{6x^2}{3x}$

$= 2x^{2-1}$

$= 2x$

Area = $6x^2$

$2x$

$3x$

b. $\frac{6x^2 + 3x}{3x}$ $\left(= \frac{6x^2}{3x} + \frac{3x}{3x} \right)$

$= 2x^{2-1} + 1x^{1-1}$

$= 2x + 1x^0$ (1)

$= 2x + 1$

c. $\frac{6x^2 + 3x - 12x^3}{3x}$ $\left(= \frac{6x^2}{3x} + \frac{3x}{3x} - \frac{12x^3}{3x} \right)$

$= 2x^{2-1} + 1x^{1-1} - 4x^{3-1}$

$= 2x + 1x^0 - 4x^2$ (1)

$= 2x + 1 - 4x^2$

A harder (or extending) problem would be

Find the greatest common factor of the following expression, then factor the expression.

divide by GCF and rewrite the expression as a product.

GCF $(12x^2, 4x)$

$= 4x$

$\frac{12x^2 - 4x}{4x}$

$= \frac{12x^2}{4x} - \frac{4x}{4x}$

$= 3x^{2-1} - 1x^{1-1}$

$= 3x - 1x^0$

$= 3x - 1$

$12x^2 - 4x$

$= 4x(3x - 1)$