Chapter 9: Polynomials and Factoring

Study Guide

9.1: Add and subtract polynomials:

- Be able to identify an expression as a polynomial or not. If it is, be able to classify it by the number of terms, find the degree and write it so it is in descending order.

Expression	Polynomial?	Type	Degree	Descending Order
$-\frac{1}{2}$	Y	Mono	0	$-\frac{1}{2}$
x^3y^5z	Y	Mono	9	x^3y^5z
$3x+\frac{1}{x}$	N	-	-	-
$7bc^3+4b^4c$	Y	Bi	5	$4b^4c+7bc^3$
$5ab^3c^5-4a^2bc^2+3a^3b^3c$	Y	Tri	9	$3a^3b^3c-4a^2bc^2+5ab^3c^5$
$5z+2z^3-z^2+3z^4$	Y	Poly	4	$3z^4+2z^3-z^2+5z$
$-8rs^2+3r^2s-4r^2s^2+9r-3s$	Y	Poly	4	$-4r^2s^2+3r^2s-8rs^2+9r-3s$

- Be able to add and subtract polynomials:

Ex: $(9x+6x^3-8x^2)+(-5x^3+6x)$

x^3-8x^2+15x

Ex: $(2s^3+8)-(-3s^3+7s-5)$

$5s^3-7s+13$

9.2 – 9.3: Multiply Polynomials/Special Products Formulas:

- Be able to distribute, FOIL and multiply polynomials

Ex: $(-3d+10)(2d-1)$

$-6d^2+23d-10$

Ex: $(2s+5)(s^2+3s-1)$

$2s^3+11s^2+13s-5$

Ex: $(m+7)(m-3)+(m-4)(m+5)$

$2m^2+5m-41$

- Be able to apply special products formulas

Ex: $(3m-7n)^2$

$9m^2-42mn+49n^2$

Ex: $(3x+8y)^2$

$9x^2+48xy+64y^2$

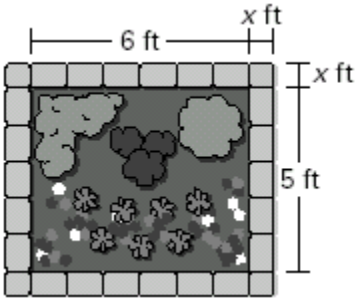
Ex: $(2a-5b)(2a+5b)$

$4a^2-25b^2$

Ex: You are designing a rectangular flower bed that you will border using brick pavers. The width of the border around the bed will be the same on every side, as shown.

a. Write a polynomial that represents the total area of the flower bed and the border.

$4x^2 + 22x + 30$



b. Find the total area of the flower bed and border when the width of the border is 1.5 feet.

72 ft²

9.4: Factor Using the GCF:

- Be bale to identify the GCF of a quadratic expression and factor using this method.

Ex: $2x^2 - 4x$

$2x(x - 2)$

Ex: $-4y + 16y^2$

$-4y(1 - 4y)$

Ex: $3xy + 8xy^2$

$xy(3 + 8y)$

- Be able to solve a quadratic equation in factored form.

Ex: $(3x-1)(x+2) = 0$

$x = \frac{1}{3} \quad x = -2$

Ex: $x(2x-5) = 0$

$x = 0 \qquad x = \frac{5}{2}$

Ex: $x(3x-7)(4x-1) = 0$

$x = 0 \quad x = \frac{7}{3} \quad x = \frac{1}{4}$

- Be able to solve a quadratic equation by factoring using the GCF first!

Ex: $7x^2 + 21x = 0$

$x = 0 \quad x = -3$

Ex: $8x^2 - 16x = 0$

$x = 0 \quad x = 2$

Ex: $2x^2 = -7x$

$x = 0 \quad x = -\frac{7}{2}$

9.5: Factor Quadratics in the Form $y = x^2 + bx + c$:

- Be able to factor trinomials in the form $x^2 + bx + c$ by factoring into two binomials in the form: $(x + p)(x + q)$

Ex: $x^2 - 7x + 12$

$(x - 4)(x - 3)$

Ex. $x^2 - 2x - 24$

$(x - 6)(x + 4)$

Ex: $-x^2 - 9x - 18$

$-1(x + 6)(x + 3)$

- Be able to solve quadratic equations by factoring first.

Ex: $x^2 - 7x + 12 = 0$

$x = 4$ $x = 3$

Ex: $x^2 - 17x + 60 = 0$

$x = 12$ $x = 5$

Ex: $x^2 + 8x = -12$

$x = -6$ $x = -2$

9.6: Factor Quadratics in the Form $y = ax^2 + bx + c$:

- Be able to factor quadratics in the form $y = ax^2 + bx + c$ into two binomials either using the $ax^2 + mx + nx + c$ method or number combinations method.

Ex: $3x^2 + x - 2$

$(3x - 2)(x + 1)$

Ex: $5x^2 - 6x + 1$

$(5x - 1)(x - 1)$

Ex: $3x^2 + 13x + 4$

$(3x + 1)(x + 4)$

- Be able to solve quadratics in the form $y = ax^2 + bx + c$ by factoring first.

Ex: $3x^2 + x - 2 = 0$

$x = \frac{2}{3}$ $x = -1$

Ex: $2x^2 - 3x - 35 = 0$

$x = -\frac{7}{2}$ $x = 5$

Ex: $4x^2 + 11x = 3$

$x = \frac{1}{4}$ $x = -3$

9.7: Factor Special Products:

- Be able to factor difference of two squares

Ex: $x^2 - 25$

$(x + 5)(x - 5)$

Ex: $4x^2 - 169$

$(2x - 13)(2x + 13)$

Ex: $2x^2 - 50$

$2(x + 5)(x - 5)$