

## 5.4 Exponent Rules and Multiplying Monomials

$$\text{Ex: } x^2(x^3) = x \cdot x (x \cdot x \cdot x) = x^5$$

$$x^3(x^6) = x^9$$

$$x(x) = x^2$$

$$x^2(y^3) = x^2y^3$$

$$3^2(2^3) \neq 6^5$$
$$= 3^2(2^3) = 72$$

$$2^2(2^3) = 2^5$$

## Product Rule for Exponents

$$a^m a^n = a^{m+n}$$

## Raising a Power to a Power

EX:  $(x^2)^3 = (x^2)(x^2)(x^2) = x^6$

$$(y^4)^3 = y^{12}$$

$$(y)^6 = y^6$$

$$(a^m)^n = a^{mn}$$

## 5.5 Multiplying Polynomials; Special Products

### Multiplying a Polynomial by a Monomial

$$\text{Ex: } a(b+c) = ab+ac$$

$$\begin{array}{r} \underbrace{2x} \quad \underbrace{(3x - 4y)} = \quad 6x - 4y \\ \underbrace{a} \quad \underbrace{b} \quad \underbrace{c} \end{array}$$
$$6x^2 - 8xy$$
$$6x^2 - 4y(2x)$$

$$ab - ac$$

$$2x(3x) - (2x)(4y)$$

$$6x^2 - 8xy$$

$$3x^2(4x^2 - 2x + 3) = 12x^4 - 6x^3 + 9x^2$$

$$3x^2y^3z(x^4 + 3x^2y - 7yz + 12z)$$

$$3x^6y^3z + 9x^4y^4z - 21x^2y^4z^2 + 36x^2y^3z^2$$

$$2xy^2z^4(6x^4 - 3xyz^2 + 2y - 7z^6 + 1)$$

$$12x^5y^2z^4 - 6x^2y^3z^6 + 4xy^3z^4 - 14xy^2z^{10} + 2xy^2z^4$$

## Binomial Multiplication

Multiplying  $23 \cdot 15$

$$\begin{array}{r} 23 \\ \times 15 \\ \hline 115 \\ 23 \phantom{0} \\ \hline 345 \end{array}$$

compare with  $x+4$   
 $x+3$

$$\begin{array}{r} x+4 \\ x+3 \\ \hline 3x+12 \\ x^2+4x \\ \hline x^2+7x+12 \end{array}$$

$$\begin{aligned} (x+3)(x+4) &= x^2 + \underline{4x + 3x} + 12 \\ &= x^2 + 7x + 12 \end{aligned}$$

$$\begin{aligned} (x+2)(x+3) &= x^2 + 3x + 2x + 6 \\ &= x^2 + 5x + 6 \end{aligned}$$

$$\begin{aligned} (2x+3)(4x+5) &= 8x^2 + 10x + 12x + 15 \\ &= 8x^2 + 22x + 15 \end{aligned}$$

$$\begin{aligned} (x+3)(x-4) &= x^2 - 4x + 3x - 12 \\ &= x^2 - x - 12 \end{aligned}$$

$$\begin{aligned} (2x+5)(2x-5) &= 4x^2 - 10x + 10x - 25 \\ &= 4x^2 - 25 \end{aligned}$$

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

## **Multiply Two Binomials**

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

## **Special Products**

### **Conjugates**

### **Squaring a Binomial**

## 5.6 Exponent Rules and Dividing Polynomials

### Quotient Rule

$$\frac{x^6}{x^2}$$

### Dividing a Polynomial by a Monomial

## **Exponent Rules (p 444)**

**p 445**

**p 454**

**p 458**