

$$(3x-4)(4x-5) = 12x^2 - 15x - 16x + 20$$
$$12x^2 - 31x + 20$$

$$(4x-3)(4x+3) = 16x^2 + 12x - 12x - 9$$
$$16x^2 - 9$$

Multiply Two Binomials

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

Special Products

$$(ax+b)(ax-b) =$$

$$a^2x^2 - \underline{abx + abx} - b^2 = a^2x^2 - b^2$$

Conjugates

EXPRESSION

$$x+2$$

$$3y+4$$

$$5x-6$$

$$-3x+4$$

CONJUGATE

$$x-2$$

$$3y-4$$

$$5x+6$$

$$-3x-4$$

$$\begin{aligned}
 (5x-6)(-5x-6) &= -25x^2 - 30x \\
 &\quad + 30x + 36 \\
 &= -25x^2 + 36
 \end{aligned}$$

Squaring a Binomial

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$$\begin{aligned}
 \text{EX: } (x+3)^2 &= (x+3)(x+3) \\
 &= x^2 + 3x + 3x + 9 \\
 &= x^2 + 6x + 9
 \end{aligned}$$

$$\text{NOTE: } (a+b)^2 \neq a^2 + b^2$$

5.6 Exponent Rules and Dividing Polynomials

$$\text{EX: } x^2 \cdot x^5 = x^7$$

$$\frac{x^5}{x^2} = \frac{\cancel{x \cdot x} \cdot \cancel{x \cdot x} \cdot x}{\cancel{x \cdot x}} = x^3$$

$$\frac{x^6}{x^2} = x^4$$

$$\frac{x^7}{x} = x^6$$

$$\frac{x^3}{x^2} = x$$

$$\frac{x^3}{x^3} = 1 \quad \left| \quad \frac{6}{6} = 1 \quad \frac{14}{14} = 1 \right.$$

in exponents

$$x^{3-3} = x^0$$

$$\frac{0}{0} = \text{undefined}$$

Def $x^0 = 1, x \neq 0.$

$$\frac{x^6}{x^2} = x^4$$

$$\frac{x^2}{x^6} = x^{2-6} = x^{-4}$$

$$\frac{\overbrace{x \cdot x}^{\cancel{x \cdot x}}}{\underbrace{x \cdot x \cdot x \cdot x \cdot x \cdot x}_{\cancel{x \cdot x \cdot x \cdot x \cdot x \cdot x}}} = \frac{1}{x^4}$$

Def: $x^{-n} = \frac{1}{x^n}$

$$\text{EX: } x^{-3} = \frac{1}{x^3}$$

$$\begin{aligned} \frac{x^6}{x^3} &= x^3 \\ \hookrightarrow \frac{x^6}{1} \cdot \frac{1}{x^3} & \end{aligned}$$

$$x^6 x^{-3} = x^3$$

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

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

$$x^{-1} = \frac{1}{x}$$

$$\frac{1}{x^{-3}} = \frac{\textcircled{1}}{\textcircled{\frac{1}{x^3}}} = \frac{1}{1} \cdot \frac{x^3}{1} = x^3$$

$$\frac{1}{x^{-6}} = x^6$$

Quotient Rule

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

Dividing a Polynomial by a Monomial

$$\frac{12x^6 - 8x^4 + 6x^3 + 4x^2}{2x^2}$$

$$\frac{12x^6}{2x^2} - \frac{8x^4}{2x^2} + \frac{6x^3}{2x^2} + \frac{4x^2}{2x^2}$$

$$6x^4 - 4x^2 + 3x + 2$$

$$\frac{18x^6 + 6x^5 - 3x^3 + 3x^2}{3x^2}$$

$$6x^4 + 2x^3 - x + 1$$

Exponent Rules (p 444)

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