

4.3 Division of Polynomials

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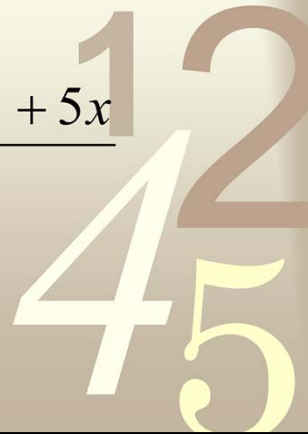


Division by a Monomial

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Divide each term of the polynomial by the monomial

Example: Divide $\frac{5x^3 - 10x^2 + 5x}{15x^2}$



Long Division of Polynomials

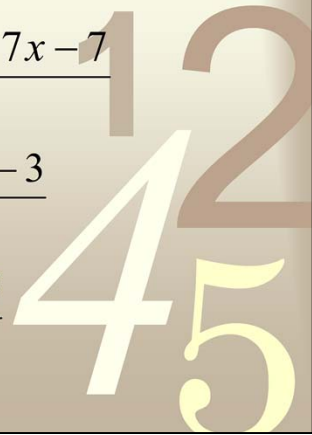
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The process of long division of polynomials is similar to long division of numbers.

Examples: Divide $\frac{12x^3 - 14x^2 + 7x - 7}{3x - 2}$

Divide $\frac{x^3 - x^2 + 2x - 3}{x^2 + 3}$

Divide $\frac{3x^4 - 2x^2 - 5}{3x^2 - 5}$



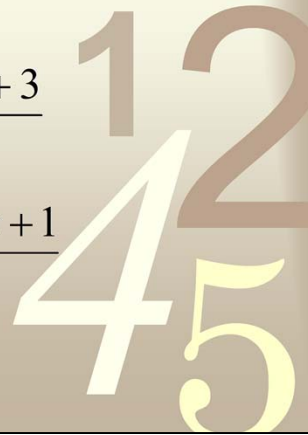
Synthetic Division

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Synthetic division is a short cut to the process of long division.

Examples: Divide $\frac{x^3 - 2x^2 - x + 3}{x + 1}$

Divide $\frac{x^4 + 3x^3 - 4x + 1}{x + 2}$



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REMAINDER THEOREM

If a polynomial $f(x)$ is divided by $x - k$, the remainder is $f(k)$.

Example: Use the remainder theorem to find the remainder when $f(x) = -4x^2 + 6x - 7$ is divided by $x + 4$

From *Precalculus with Modeling and Visualization* 3rd ed. by Rockswold, 2006, p.279