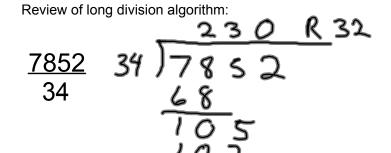
- 2.3 Polynomials and Synthetic Division
- Use long division to divide a polynomial by a polynomial
- Use synthetic division to divide polynomials by a binomial
- Use the Remainder Theorem and Factor Theorem



Polynomial division:

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

Synthetic division - a shortcut

$$\frac{43x^{2}+4x+1}{3x^{2}+5x^{2}-3x+27x^{2}}$$

$$\frac{3x^{3}+5x^{2}-3x+27}{x+3}$$

$$\frac{3x^{3}+9x^{2}}{x+3}$$

$$\frac{3x^{3}+9x^{2}}{-4x^{2}-3x}$$

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

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

$$\frac{-6x^{2}-3x+27}{-6x^{2}-12x}$$

$$\frac{$$

$$\frac{P(x)}{(x-r)}$$

$$P(r) = 0$$

If the remainder is zero, then x-r is a factor of P(x) and P(r) = 0.

Divide by (x+4)

$$P(x) = 3x^3 + 4x^2 + 8$$

Divide by x+2

-2 3 4 0 8

-6 4 -8

3 -2 4 ©