Lesson 5.4 Dividing Polynomials

Monday, February 10, 2025 8:13 PM

Click the link below for the interactive Pear Deck PowerPoint

https://app.peardeck.com/student/trufkmhcj

MCA 5.4 Dividing P...

Exponents and Polynomials

5.4 Dividing Polynomials and Synthetic Division

1

What You Will Learn

- Divide polynomials by monomials and write in simplest form.

- Divide polynomials by monomials and write in simplest form.
- Use long division to divide polynomials by polynomials.
- Use synthetic division to divide polynomials.
- Use division of polynomials to solve real-life problems.

Example 1 – Dividing a Polynomial by a Monomial

Perform the division and simplify.

$$\frac{12x^2 - 20x + 8}{4x}$$

Solution:

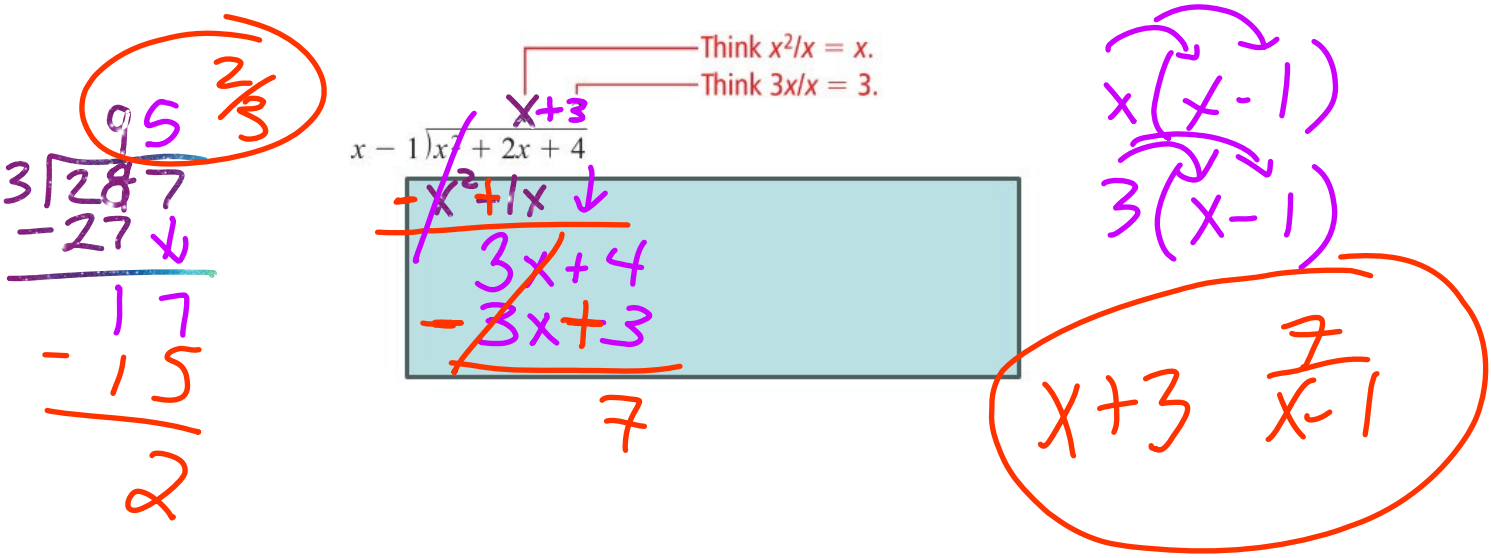
$$\frac{12x^2 - 20x + 8}{4x} = \frac{12x^2}{4x} - \frac{20x}{4x} + \frac{8}{4x}$$

Divide each term in the numerator by $4x$.

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

Factor numerators.

Example 3 – Long Division Algorithm for Polynomials



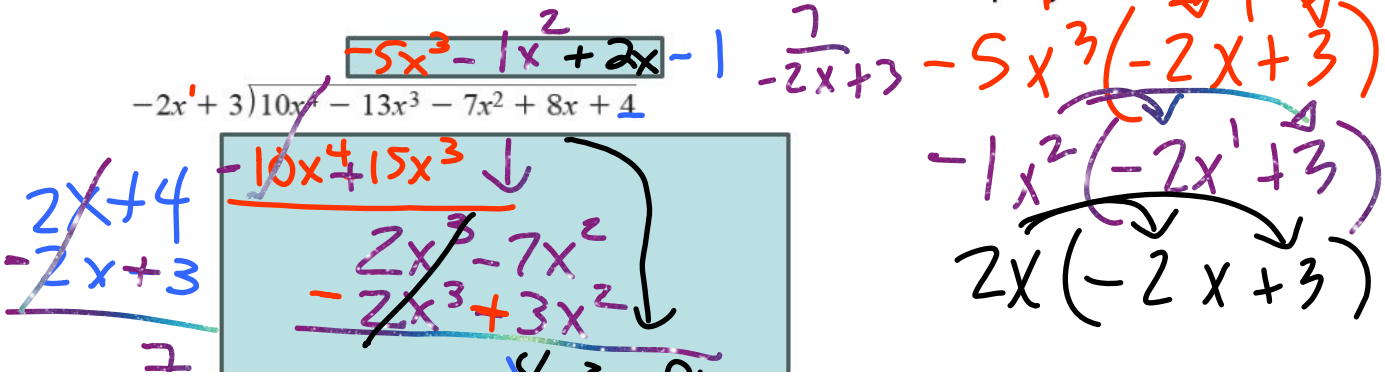
Students, draw anywhere on this slide!

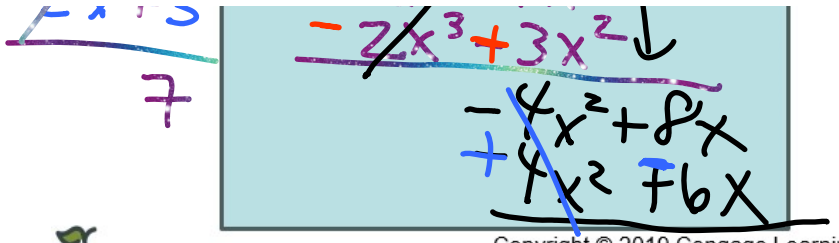
Example 4 – Writing in Standard Form Before Dividing

Divide $-13x^3 + 10x^4 + 8x - 7x^2 + 4$ by $3 - 2x$.

Solution:

First write the divisor and dividend in standard polynomial form.





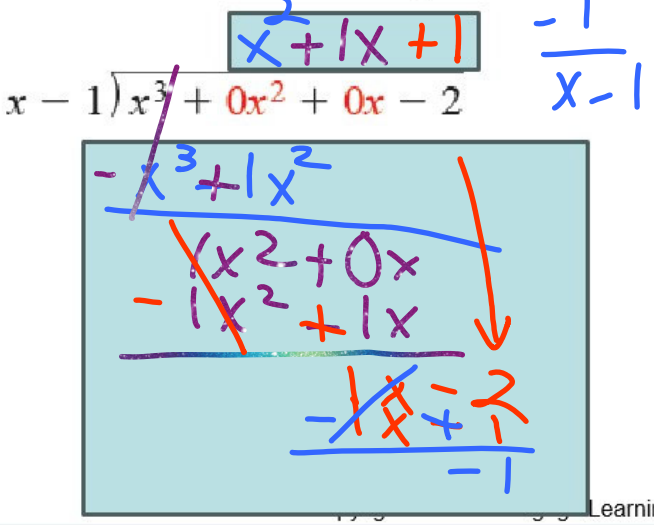
Students, draw anywhere on this slide!

Example 5 – Accounting for Missing Powers of *x*

Divide $x^3 - 2$ by $x - 1$.

Solution:

To account for the missing x^2- and x-terms, insert $0x^2$ and 0x.

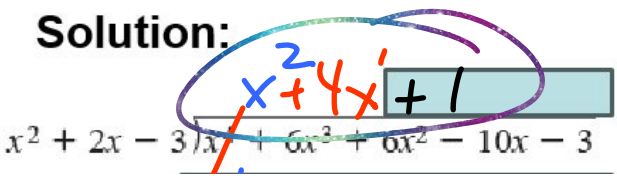


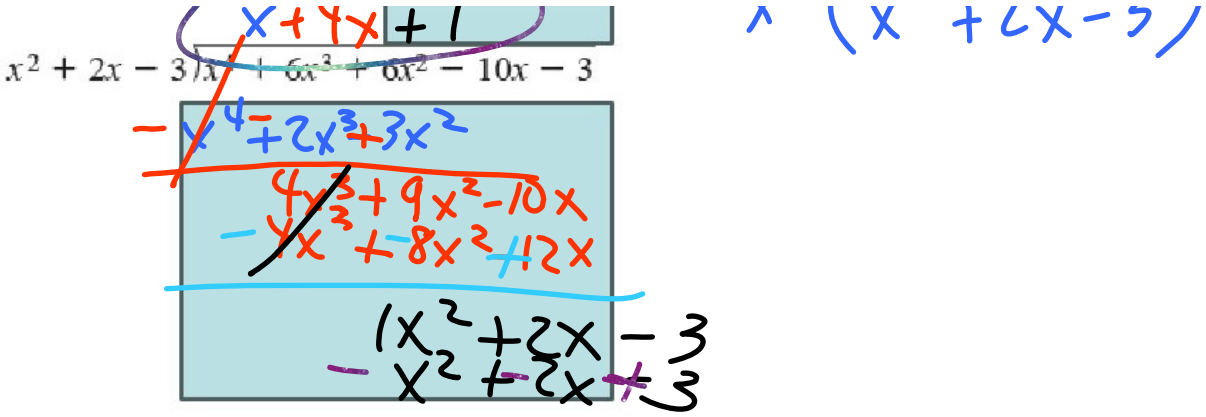
Students, draw anywhere on this slide!

Example 6 – A Second-Degree Divisor

Divide $x^4 + 6x^3 + 6x^2 - 10x - 3$ by $x^2 + 2x - 3$.

Solution:





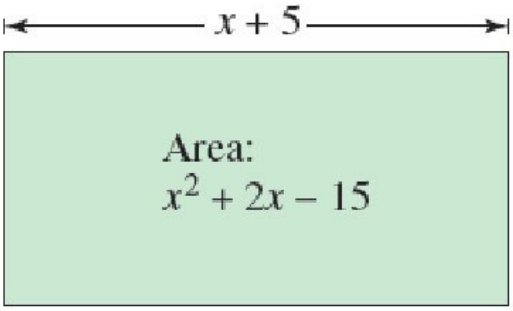
Example 8 – Geometry: Finding the Width of a Rectangle

The area of a rectangle is $(x^2 + 2x - 15)$ square feet and its length is $(x + 5)$ feet. Find the width of the rectangle.

Solution:

$A = LW$

$\frac{A}{L} = \frac{LW}{L}$



Example 8 – Geometry: Finding the Width of a Rectangle cont'd

Example 8 – Geometry: Finding the Width of a Rectangle cont'd

Verbal Model: Area = Length × Width

Labels: Area = $x^2 + 2x - 15$ (square feet)

Length = $x + 5$ (feet)

Equation: $x^2 + 2x - 15 = (x + 5)(\text{Width})$ ⇨ $\text{Width} = \dfrac{x^2 + 2x - 15}{x + 5}$

$x - 3$

$x+5 \overline{)\, x^2 + 2x - 15}$

$-x^2 - 5x$

$-3x - 15$

$+3x + 15$

Students, draw anywhere on this slide!