

Sec. 11.3 Dividing Polynomials

Problem 1:

a. What is $(5x^3 - 10x^2 + 20x) \div 5x^2$? 1 term

$$\frac{1}{5x^2}(5x^3 - 10x^2 + 20x) = \frac{5x^3}{5x^2} - \frac{10x^2}{5x^2} + \frac{20x}{5x^2} \quad \frac{x^3}{x \cdot x}$$

$$1x - 2 + \frac{4}{x}$$

b. $(4a^3 + 10a^2 + 3a) \div 2a^2$

$$\frac{4a^3 + 10a^2 + 3a}{2a^2} = \frac{4a^{3-2}}{2a^2} + \frac{10a^2}{2a^2} + \frac{3a}{2a^2} = \frac{4a^1}{2a^2} + 5 + \frac{3}{2a}$$

$$2a + 5 + \frac{3}{2a}$$

Problem 2:

a. $(2x^2 - 19x + 24) \div (x - 8)$ 2 or more terms

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

$$2x(x - 8) = 2x^2 - 16x$$

$$-3(x - 8) = -3x + 24$$

$$2x^2 - 19x + 24 - (2x^2 - 16x - 3x + 24) = 0$$

$2x - 3$

$$\begin{array}{r} 52 \frac{1}{7} \\ 7 \overline{) 368} \\ \underline{-35} \\ 18 \\ \underline{-14} \\ 4 \end{array}$$

$$\frac{9}{5} \div \frac{4}{5} = 1 \frac{4}{5}$$

$$\textcircled{5} \overline{) \frac{9}{5}} = 1 \frac{4}{5}$$

$$(2m^2 - m - 3) \div (m + 1)$$

$$\begin{array}{r} 2m - 3 \\ (m + 1) \overline{) 2m^2 - m - 3} \\ \underline{-2m^2 + 2m} \\ 3m - 3 \\ \underline{+3m + 3} \\ 0 \end{array}$$

$\frac{2m^2}{m} = 2m$
 $\frac{-3m}{m} = -3$

CHANGE SIGNS

Problem 3:

The width and area of a rectangle are shown below. What is an expression for the length?

$A = x^2 + 3x - 18$ $w = x - 3$ $l = \frac{A}{w}$

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

$$\begin{array}{r} x + 6 \\ (x - 3) \overline{) x^2 + 3x - 18} \\ \underline{-x^2 + 3x} \\ 6x - 18 \\ \underline{-6x + 18} \\ 0 \end{array}$$

Divide

a. $(h^3 - 4h + 12) \div (h + 3)$

$$\begin{array}{r} h^2 - 3h + 5 - \frac{3}{h+3} \\ (h + 3) \overline{) h^3 - 4h + 12} \\ \underline{-h^3 + 3h^2} \\ 3h^2 - 4h + 12 \\ \underline{-3h^2 + 9h} \\ 5h + 12 \\ \underline{-5h + 15} \\ R = -3 \end{array}$$

$\frac{h^3}{h} = h^2$
 $\frac{-3h^2}{h} = -3h$
 $\frac{5h}{h} = 5$

$\frac{8}{3} = 2\frac{2}{3}$

$3 \overline{) 8} = 2 \frac{2}{3}$

b. $(-21x - 20 + 9x^2) \div (-1 + x)$

$$\begin{array}{r} 9x - 12 - \frac{32}{x-1} \\ (x - 1) \overline{) 9x^2 - 21x - 20} \\ \underline{-9x^2 + 9x} \\ -12x - 20 \\ \underline{+12x + 12} \\ -32 \end{array}$$

$\frac{9x^2}{x} = 9x$
 $\frac{-12x}{x} = -12$

