

Name:

Period:

Key

Practice Worksheet: Dividing Polynomials

Find the quotient using polynomial long division. You must show your work to get credit.

1. $(x^3 - 4x + 6) \div (x + 3)$

$$\begin{array}{r} -3 \overline{) 1 \quad 0 \quad -4 \quad 6} \\ \underline{1 \quad -3 \quad 9 \quad -15} \\ \quad -3 \quad 5 \quad -9 \\ \quad \quad -9 \quad 6 \\ \quad \quad \quad 6 \end{array}$$

$= x^2 - 3x + 5 - \frac{9}{x+3}$

2. $(3x^3 - 5x^2 + 10x - 3) \div (3x + 1)$

$$\begin{array}{r} x^2 - 2x + 4 \\ 3x+1 \overline{) 3x^3 - 5x^2 + 10x - 3} \\ \underline{3x^3 + x^2} \\ -6x^2 + 10x - 3 \\ \underline{-6x^2 - 2x} \\ 12x - 3 \\ \underline{12x + 4} \\ -7 \end{array}$$

$x^2 - 2x + 4 - \frac{7}{3x+1}$

3. $(4x^4 + 3x^3 + 2x + 1) \div (x^2 + x + 2)$

$$\begin{array}{r} x^2 + x + 2 \overline{) 4x^4 + 3x^3 + 0x^2 + 2x + 1} \\ \underline{4x^4 + 4x^3 + 8x^2} \\ -1x^3 - 8x^2 + 2x + 1 \\ \underline{-1x^3 - 1x^2 - 2x} \\ -7x^2 + 4x + 1 \\ \underline{-7x^2 - 7x - 14} \\ 11x + 15 \end{array}$$

4. $(3x^3 + 11x^2 + 4x + 1) \div (x^2 + x)$

$$\begin{array}{r} 3x + 8 \\ x^2 + x \overline{) 3x^3 + 11x^2 + 4x + 1} \\ \underline{3x^3 + 3x^2} \\ 8x^2 + 4x + 1 \\ \underline{8x^2 + 8x} \\ -4x + 1 \\ \underline{-4x + 4} \\ -3 \end{array}$$

$= 3x + 8 + \frac{-4x+1}{x^2+x}$

A polynomial f and a factor of f are given. Factor the polynomial completely using long division. Show work.

5. $f(x) = 2x^3 - 15x^2 + 34x - 21; (x - 1)$

$$\begin{array}{r} \downarrow \\ 2 \quad -15 \quad 34 \quad -21 \\ \underline{1 \quad -1 \quad 2 \quad -13 \quad 21} \\ 2 \quad -13 \quad 21 \quad 0 \end{array}$$

yes

$= (2x^2 - 13x + 21)$

$(x-1)(2x-7)(x-3)$

6. $f(x) = 4x^3 + 8x^2 - 25x - 50; (x + 2)$

$$\begin{array}{r} -2 \overline{) 4 \quad 8 \quad -25 \quad -50} \\ \underline{4 \quad -8 \quad 0 \quad 50} \\ 4 \quad 0 \quad -25 \quad 0 \end{array}$$

yes

$= (4x^2 - 25)$

$(x+2)(2x+5)(2x-5)$