Extra Examples **Sec. 3-3**

1 use long division

$(16x^4 + 40x^3 - 8x^2 - 14x + 15) \div (2x + 5)$

$$8x^3 - 4x + 3$$
$$2x+5 \;\overline{)\; 16x^4+40x^3-8x^2-14x+15}$$
$$-(16x^4+40x^3)$$
$$-8x^2-14x$$
$$-(-8x^2-20x)$$
$$6x+15$$
$$-(6x+15)$$
$$0$$

$= 8x^3 - 4x + 3$

2 divide using synthetic division

$(x^4 - 6x^3 - 40x + 33) \div (x + 7)$

$+0x^2$

$x-(-7)$

$$\begin{array}{r|rrrrr} -7 & 1 & -6 & 0 & -40 & 33 \\ & & -7 & 91 & -637 & 4739 \\ \hline & 1 & -13 & 91 & -677 & 4772 \end{array}$$

x

$$x^3 - 13x^2 + 91x - 677 + \frac{4772}{x+7}$$

3 use synthetic substitution to evaluate f(x) when x = -3

$x-(-3)$

a

f(x) = $x^3 + 2x^2 - 6x - 15$

a

$$\begin{array}{r|rrrr} -3 & 1 & 2 & -6 & -15 \\ & & -3 & 3 & 9 \\ \hline & 1 & -1 & -3 & -6 \end{array}$$

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