# Section 12.2 Polynomial Division Solutions

2. $x-5 \overline{)\, x^3-4x^2+x-2}$

$$\begin{array}{r} x^2+x+6 \\ x-5 \overline{)\, x^3-4x^2+x-2} \\ \underline{x^3-5x^2} \\ x^2+x \\ \underline{x^2-5x} \\ 6x-2 \\ \underline{6x-30} \\ 28 \end{array}$$

$x^3-4x^2+x-2 = (x^2+x+6)(x-5)+28$

4. $x-1 \overline{)\, 3x^2+4x-1}$

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

$3x^2+4x-1 = (3x+7)(x-1)+6$

6. $\dfrac{x^4-4x^3+6x^2-4x+1}{x-1} \Rightarrow$

$$\begin{array}{r} x^3-3x^2+9x+5 \\ x-1 \overline{)\, x^4-4x^3+6x^2-4x+1} \\ \underline{x^4-x^3} \\ -3x^3+6x^2 \\ \underline{-3x^3-3x^2} \\ 9x^2-4x \\ \underline{9x^2-9x} \\ 5x+1 \\ \underline{5x-5} \\ 6 \end{array}$$

$x^4-4x^3+6x^2-4x-1 = (x-1)(x^3-3x^2+9x+5)+6$

8. $x^2-x+1 \overline{)\, 4x^3-x^2+8x-1}$

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

$4x^3-x^2+8x-1 = (4x+3)(x^2-x+1)+(7x-4)$

10. $x-2 \overline{)\, x^6 + 0 + 0 + 0 + 0 + 64}$

$x^5 + 2x^4 + 4x^3 + 8x^2 + 16x + 32$

$x^6 - 2x^5$

$2x^5$

$2x^5 - 4x^4$

$4x^4$

$4x^4 - 8x^3$

$8x^3$

$8x^3 - 16x^2$

$16x^2$

$16x^2 - 32x$

$32x + 64$

$32x - 64$

$128$

$x^6 = (x-2)(x^5 + 2x^4 + 4x^3 + 8x^2 + 16x + 32) + 128$

16. $t^3 - 2 \overline{)\, 2t^5 - 6t^4 - 0 - t^2 + 2t + 3}$

$2t^2 - 6t$

$2t^5 \quad - 4t^2$

$-6t^4 - 0 + 3t^2 + 2t$

$-6t^4 \quad + 12t$

$3t^2 - 10t + 3$

$2t^5 - 6t^4 - t^2 + 2t + 3 = (t^3 - 2)(2t^2 - 6t) + 3t^2 - 10t + 3$