

3.3

$$1) \begin{array}{rrrr} 1 & -3 & 0 & 4 \\ & 2 & -2 & -4 \\ \hline 1 & -1 & -2 & \parallel 0 \end{array}$$

$$x^3 - 3x^2 + 4 = (x - 2)(x^2 - x - 2)$$

$$\begin{array}{rrr} 1 & -1 & -2 \\ & -1 & 2 \\ \hline 1 & -2 & \parallel 0 \end{array}$$

$$x^2 - x - 2 = (x + 1)(x - 2)$$

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

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

$$2) \begin{array}{rrrr} 4 & 4 & -5 & -3 \\ & 4 & 8 & 3 \\ \hline 4 & 8 & 3 & \parallel 0 \end{array}$$

$$4x^3 + 4x^2 - 5x - 3 = (x - 1)(4x^2 + 8x + 3)$$

$$\begin{array}{rrr} 4 & 8 & 3 \\ & -2 & -3 \\ \hline 4 & 6 & \parallel 0 \end{array}$$

$$4x^2 + 8x + 3 = (x + \frac{1}{2})(4x + 6)$$

$$4x^3 + 4x^2 - 5x - 3 = (x - 1)(4x^2 + 8x + 3) = (x - 1)(x + \frac{1}{2})(4x + 6)$$

$$(4x^3 + 4x^2 - 5x - 3) : ((x - 1)(x + \frac{1}{2})) = 4x + 6$$

$$3) \begin{array}{rrrrr} 1 & 0 & -5 & 0 & 4 \\ & 1 & 1 & -4 & -4 \\ \hline 1 & 1 & -4 & -4 & \parallel 0 \end{array}$$

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

$$\begin{array}{rrrr} 1 & 1 & -4 & -4 \\ & -2 & 2 & 4 \\ \hline 1 & -1 & -2 & \parallel 0 \end{array}$$

$$x^3 + x^2 - 4x - 4 = (x + 2)(x^2 - x - 2)$$

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

$$(x^4 - 5x^2 + 4) : ((x - 1)(x + 2)) = x^2 - x - 2$$