

57 $2, 4+\sqrt{5}, 4-\sqrt{5}$

$$f(x) = (x-2)(x-(4+\sqrt{5}))(x-(4-\sqrt{5}))$$

$$(x-2)(x-4-\sqrt{5})(x-4+\sqrt{5})$$

$$x^2 - 4x + x\cancel{\sqrt{5}} - 4x + 16 - 4\cancel{\sqrt{5}} - \cancel{x\sqrt{5}} + 4\cancel{\sqrt{5}} - 5$$

$$(x-2)(x^2 - 8x + 11)$$

$$f(x) = x^3 - 10x^2 + 27x - 22$$

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2-3 Polynomial Division

Ex 1 Show that $(x-2)$ is a factor and find the remaining factors.

$$f(x) = 2x^3 + x^2 - 7x - 6 = (x-2)(2x^2 + 5x + 3)$$

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

$$\begin{array}{r} 2 \quad 1 \\ \underline{-} 2 \quad 1 \rightarrow -6 \\ \quad 4 \quad 10 \quad 6 \\ \hline \quad 2 \quad 5 \quad 3 \mid 0 \end{array}$$

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Ex 2 Show that $(x+4)$ is a factor and find the remaining factors.

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

$$\begin{array}{r} -4 \mid 2 \quad 9 \quad 3 \quad -4 \\ \quad -8 \quad -4 \quad 4 \\ \hline \quad 2 \quad 1 \quad -1 \mid 0 \end{array} \quad (x+4)(2x^2 + x - 1)$$

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Ex 3 Divide: $(x^5 - 1) \div (x - 1)$

$$\begin{array}{r} 1 \quad 1 \quad 0 \quad 0 \quad 0 \quad 0 \quad -1 \\ \quad \quad \quad \quad \quad \quad \quad \quad | \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad 1 \quad 1 \quad 1 \quad 1 \quad 1 \\ \hline \quad \quad \quad \quad \quad \quad \quad \quad 1 \quad 1 \quad 1 \quad 1 \quad 1 \mid 0 \\ x^4 + x^3 + x^2 + x + 1 \end{array}$$

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Ex. 4 Divide: $(6x^4 - x^3 - x^2 + 9x - 3) \div (x^2 + x - 1)$

$$\begin{array}{r} 6x^2 - 7x + 12 + \frac{-10x + 9}{x^2 + x - 1} \\ x^2 + x - 1 \overline{)6x^4 - x^3 - x^2 + 9x - 3} \\ - (6x^4 + 6x^3 - 6x^2) \\ \hline - 7x^3 + 5x^2 + 9x - 3 \\ - (-7x^3 - 7x^2 + 7x) \\ \hline 12x^2 + 2x - 3 \\ - (12x^2 + 12x - 12) \\ \hline - 10x + 9 \end{array}$$

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Homework
p.127
#1-9, 15-21 odds
#39 & 40

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