p159-160 #7, 9, 15, 21, 23, 27, 29, 35, 45(a,b), 49, 51, 65

(7)

$$4x+5 \overline{)\,x^2-3x+1}$$

$$4x^3-7x^2-11x+5$$

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

$$-12x^2-11x$$

$$-(-12x^2-15x)$$

$$4x+5$$

$$4x+5$$

$$0$$

(9)

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

$$x^4+5x^3+6x^2-x-2$$

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

$$3x^3+6x^2$$

$$3x^3+6x^2$$

$$0-x-2$$

$$-(-x-2)$$

$$0$$

(15)

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

$$x^4+0x^3+3x^2+0x+1$$

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

$$2x^3+0x^2+0x$$

$$-(2x^3-4x^2+6x)$$

$$4x^2-6x+1$$

$$-(4x^2-8x+12)$$

$$2x-11$$

$$x^2+2x+4+\frac{2x-11}{x^2-2x+3}$$

(21)

$$\begin{array}{r|cccc} -2 & 4 & 8 & -9 & -18 \\ & & -8 & 0 & 18 \\ \hline & 4 & 0 & -9 & 0 \end{array}$$

$4x^2 - 9$

(23)

$$\begin{array}{r|cccc} -10 & -1 & 0 & 75 & -250 \\ & & 10 & -100 & 250 \\ \hline & -1 & 10 & -25 & 0 \end{array}$$

$-x^2 + 10x - 25$

(27) $\dfrac{10x^4 - 50x^3 - 800}{x-6} = 10x^3 + 10x^2 + 60x + 360 + \dfrac{1360}{x-6}$

$$\begin{array}{r|ccccc} 6 & 10 & -50 & 0 & 0 & -800 \\ & & 60 & 60 & 360 & 2160 \\ \hline & 10 & 10 & 60 & 360 & 1360 \end{array}$$

(29) $\dfrac{x^3 + 512}{x+8} = x^2 - 8x + 64$

$$\begin{array}{r|cccc} -8 & 1 & 0 & 0 & 512 \\ & & -8 & 64 & -512 \\ \hline & 1 & -8 & 64 & 0 \end{array}$$

(35) $\dfrac{4x^3+16x^2-23x-15}{x+\frac{1}{2}} = \boxed{4x^2+14x-30}$

$-\frac{1}{2}$ | 4 16 −23 −15
−2 −7 15
4 14 −30 0

(45) $f(x)=4x^3-13x+10$

a) $f(1)=1$ ✓

1 | 4 0 −13 10
4 −9
4 4 −9 1 ✓

$f(1)=4(1)^3-13(1)+10 = 4-13+10 = 1$ ✓

b) $f(-2)=4$ ✓

−2 | 4 0 −13 10
−8 16 −6
4 −8 +3 4 ✓

$f(-2)=4(-2)^3-13(-2)+10 = 4(-8)+26+10$
$= -32+26+10 = 4$ ✓

(49) $x^3-7x+6=0$, $x=2$

2 | 1 0 −7 6
2 4 −6
1 2 −3 0

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

$(x-2)(x+3)(x-1)$ ✓

(51) $2x^3 - 15x^2 + 27x - 10 = 0$, $x = \frac{1}{2}$

$\frac{1}{2}$ | 2 −15 27 −10
1 −7 +10
2 −14 20 0

$(x - \frac{1}{2})(2x^2 - 14x + 20)$

$(x - \frac{1}{2})(2x - 10)(x - 2)$

OR $(2x - 1)(x - 5)(x - 2)$

$\frac{1}{2}, 5, 2$

(65) $f(x) = x^3 - 2x^2 - 5x + 10$

estimates : -2.236 , 2.236 , 2

2 | 1 −2 −5 10
2 0 −10
1 0 −5 0

$(x - 2)(x^2 - 5)$

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