

$$2.3 \quad (x-k)(q(x)) + r$$

37.

$$f(x) = x^3 - x^2 - 14x + 11 \quad k=4$$

$$x-4$$

$$\begin{array}{r|rrrr} 4 & 1 & -1 & -14 & 11 \\ & & 4 & 12 & -8 \\ \hline & 1 & 3 & -2 & 3 \end{array}$$

$x^2 \quad x \quad c \quad r$

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

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

$$f(4) = 3$$

$$f(x) = x^2 - 5x + 1$$

$$f(2) = 2^2 - 5(2) + 1$$

$$= 4 - 10 + 1$$

$$= -5$$

$$\begin{array}{r|rr} 2 & 1 & -5 & 1 \\ & & 2 & -6 \\ \hline & 1 & -3 & -5 \end{array}$$

$$41. \quad f(x) = x^3 + 3x^2 - 2x - 14 \quad k = \sqrt{2}$$

$$\begin{array}{r|rrrr}
 \sqrt{2} & 1 & 3 & -2 & -14 \\
 & & \sqrt{2} & 3\sqrt{2}+2 & 6 \\
 \hline
 & 1 & (3+\sqrt{2}) & 3\sqrt{2} & -8 \\
 & x^2 & x & c & R
 \end{array}$$

$$f(x) = (x - \sqrt{2})(x^2 + (3 + \sqrt{2})x + 3\sqrt{2}) + 8$$

$$\begin{aligned}
 f(\sqrt{2}) &= (\sqrt{2} - \sqrt{2}) (\quad) + 8 \\
 &= 0 (\quad) \\
 &= -8
 \end{aligned}$$

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

$$-1 \left| \begin{array}{cccc} 1 & 5 & 6 & 2 \\ & -1 & -4 & -2 \\ \hline 1 & 4 & 2 & 0 \end{array} \right.$$

$$x^2 + 4x + 2$$

$$x = \frac{-4 \pm \sqrt{16 - 4(1)(2)}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{8}}{2}$$

$$x = \frac{-4 \pm 2\sqrt{2}}{2}$$

$$x = -2 \pm \sqrt{2} \quad x = -1$$

72.b

30	-153.6	5160	0	-100,000
		-4608	34560	1,036,800
	-153.6	1152	34560	936,800

2.4 Rational Zero

Possible Rational Zeros

$$f(x) = 2x^4 - x^2 - 6$$

p factors of constant $\pm 1, \pm 2, \pm 3, \pm 6$

q factors of leading coefficient $\pm 1, \pm 2$

Possible Rational Zeros = $\frac{p}{q}$

$$\pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{2}, \pm \frac{3}{2}$$

$$5. f(x) = 4x^4 - 17x^2 + 4$$

$$P \quad \pm 1, \pm 2, \pm 4$$

$$q \quad \pm 1, \pm 2, \pm 4$$

$$\frac{p}{q} \quad \pm 1, \pm \frac{1}{2}, \pm \frac{1}{4}, \pm 2, \pm 4$$

-2	-2	4	0	-17	0	4
$-\frac{1}{2}$	$-\frac{1}{2}$		-8	16	2	-4
$\frac{1}{2}$	$\frac{1}{2}$	4	-8	-1	2	0
2	2		8	0	-2	
$\frac{1}{2}$	$\frac{1}{2}$	4	0	-1	0	0
			2	1		
$-\frac{1}{2}$	$-\frac{1}{2}$	4	2	0		
2	2		-2			
		4	0			

$$x = \pm \frac{1}{2}, x = \pm 2$$