

p56 #29

29 $f(x) = 7x + 2$

$$f(9,2) - f(8,2) = [7(9,2) + 2] - [7(8,2) + 2]$$

$$(64,4 + 2) - (57,4 + 2)$$

$$66,4 - 59,4 = 7$$

$$29b \quad f(x+1) - f(x) = [7(x+1) + 2] - (7x + 2)$$

$$7x + 7 + 2 - 7x - 2 = 7$$

p61 # 18

$$P(x) = x^3 + 2x + 2R - 1$$

$$3x - 4$$

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

$$= 3x^4 + 6x^2 + 6x - 4x^3 - 8x - 8 - 1$$

$$= 3x^4 - 4x^3 + 6x^2 - 2x - 9$$

p61 # 24

$$\begin{array}{r|rrrrr} & 1x^4 & -2 & 1 & 0 & -4 \\ -1 & & -1 & 3 & -4 & 4 \\ \hline & 1x^3 & -3 & 4 & -4 & 0 \\ 2 & & 2 & -2 & 4 & \\ \hline & 1x^2 & -1x & 2 & 0 & \end{array}$$

$$x^2 - x + 2 = 0$$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(2)}}{2(1)} = \frac{1 \pm \sqrt{1-8}}{2}$$

$$= \frac{1 \pm i\sqrt{7}}{2}$$

p66 # 37 (3,0) \rightarrow root = 3tangent (0,0) \rightarrow root = 0 (dbl root)

$$y = a(x-3)(x)^2$$

$$(1,4) \rightarrow 4 = a(1-3)(1)^2 \rightarrow 4 = -2a$$

$$a = -2$$

$$y = -2(x)^2(x-3)$$

p83

$$1. \quad x^4 - 4x^2 - 12 = 0 \quad \rightarrow a = x^2$$

$$a^2 - 4a - 12 = 0$$

$$(a-6)(a+2) = 0$$

$$a=6 \rightarrow x^2=6 \rightarrow x = \pm\sqrt{6}$$

$$a=-2 \rightarrow x^2=-2 \rightarrow x = \pm\sqrt{-2} = \pm i\sqrt{2}$$

$$3. \quad (3x^3 - 16x^2)(12x + 64) = 0$$

$$x^2(3x-16) - 4(3x-16) = 0$$

$$(x^2-4)(3x-16) = 0$$

$$x^2=4 \quad x = \frac{16}{3}$$

$$x = \pm 2$$

$$5. \quad 2x^4 + 7x^2 - 15 = 0 \quad \rightarrow a = x^2$$

$$2a^2 + 7a - 15 = 0$$

$2a$	-3	$(2a-3)(a+5) = 0$
a	$+5$	

$$a = \frac{3}{2} \quad a = -5$$

$$x^2 = \frac{3}{2} \quad x^2 = -5$$

$$x = \pm\sqrt{\frac{3}{2}} \quad x = \pm\sqrt{-5}$$

$$x = \pm\frac{\sqrt{6}}{2} \quad x = \pm i\sqrt{5}$$

$$7. \quad x^3 + 2x^2 - 6x - 12 = 0$$

$$(x^3 + 2x^2) - (6x + 12) = 0$$

$$x^2(x+2) - 6(x+2) = 0$$

$$(x^2-6)(x+2) = 0$$

$$x^2=6 \quad x=-2$$

$$x = \pm\sqrt{6}$$

$$9. \quad 10x^3 + 5x - 6x^2 - 3 = 0$$

$$5x(2x^2+1) - 3(2x^2+1) = 0$$

$$(5x-3)(2x^2+1) = 0$$

$$x = \frac{3}{5} \quad x^2 = \frac{0}{2} \rightarrow x = \pm\sqrt{\frac{0-1}{2 \cdot 2}} = \pm \frac{i\sqrt{2}}{2}$$

13 $x^3 - x^2 - x + 1 = 0$

Poss roots $\frac{\pm 1}{\pm 1} = \pm 1$

$$\begin{array}{r|rrrr} & 1x^3 & -1 & -1 & 1 \\ || & & 1 & 0 & -1 \\ \hline & 1x^2 & 0 & -1 & 0 \\ & & & & x^2 - 1 = 0 \rightarrow x = \pm 1 \end{array}$$

17 $3x^3 - 4x^2 - 5x + 2 = 0$

Poss roots $\frac{\pm 1 \pm 2}{\pm 1 \pm 3} = \pm 1; \pm \frac{1}{3}; \pm 2; \pm \frac{2}{3}$

$$\begin{array}{r|rrrr} 1 & 3 & -4 & -5 & 2 \\ & & 3 & -1 & -6 \\ \hline & 3 & -1 & -6 & -4 \end{array} \quad \begin{array}{r|rrrr} 2 & 3x^3 & -4 & -5 & 2 \\ & & 6 & +4 & -2 \\ \hline & 3x^2 & +2x & -1 & 0 \\ & & 3x & -1 & \\ & & x & +1 & \end{array}$$

$(3x-1)(x+1) = 0$

$x = \frac{1}{3} \quad x = -1 \quad , \quad x = 2$

23 $f(x) = x^3 + 2x^2 - 9x - 18$

$x^2(x+2) - 9(x+2)$

$(x^2 - 9)(x+2)$

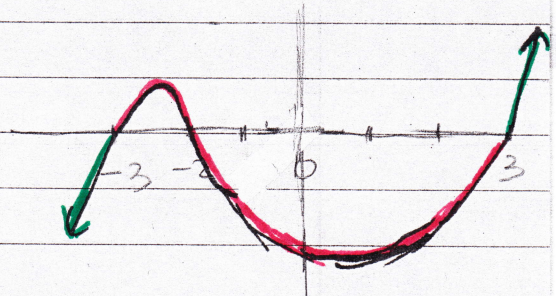
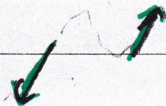
$f(x) = (x+3)(x-3)(x+2)$

$(x+3) \rightarrow \text{root} = -3$

$x-3 \rightarrow \text{root} = 3$

$x+2 \rightarrow \text{root} = -2$

leading term $x^{\textcircled{3}} \rightarrow + \text{ odd}$



p. 84

32

$$y = x^3 - x$$

$$y = 3x$$

→

$$x^3 - x = 3x$$

$$x^3 - 4x = 0$$

$$x(x^2 - 4) = 0$$

$$x(x+2)(x-2) = 0$$

$$x = 0$$

$$x = -2$$

$$x = 2$$

$$y = 3(0) = 0$$

$$y = 3(-2) = -6$$

$$y = 3(2) = 6$$

$$(0, 0)$$

$$(-2, -6)$$

$$(2, 6)$$

35

$$y = x^3 + 4x^2$$

$$y = 3x + 18$$

→

$$x^3 + 4x^2 = 3x + 18$$

$$x^3 + 4x^2 - 3x - 18 = 0$$

Possible roots: $\pm 1 \pm 2 \pm 3 \pm 6 \pm 9 \pm 18$
 ± 1

$$1 \mid \begin{array}{cccc} 1 & 4 & -3 & -18 \\ & 1 & 5 & 2 \end{array}$$

$$-1 \mid \begin{array}{cccc} 1 & 4 & -3 & -18 \\ & -1 & -3 & 6 \end{array}$$

$$1 \mid \begin{array}{cccc} 1 & 5 & 2 & -16 \end{array}$$

$$1 \mid \begin{array}{cccc} 1 & 3 & -6 & -12 \end{array}$$

$$2 \mid \begin{array}{cccc} 1x^3 & 4 & -3 & -18 \\ & 2 & 12 & 18 \end{array}$$

$$1x^2 \quad 6x \quad 9 \quad [0]$$

$$(x+3)^2 = 0$$

$x = -3$ dbl root

$$x = 2$$

$$x = -3$$

$$y = 3(2) + 18$$

$$y = 3(-3) + 18 = 9$$

$$= 24$$

$$(-3, 9)$$

$$(2, 24)$$