

6.2

Chapter 6 Review

1. $5x + 2$ linear binomial
2. -3 constant monomial
3. $6x^4 - 1$ quintic binomial
4. $5z^3 - 25 + 1$ quadratic trinomial
5. $2m^2$ quadratic monomial
6. $-4x^3 + x^2 + 3x$ cubic trinomial
7. $y = 1000x^3 + 4.22x^2 - 3.15x + 29.05$ \$ 1203.18

1. 5 mult 3
2. 0 mult 1, 8 mult 2
3. $x^2(x^2 - 8x + 16)$
 $x^2(x - 4)^2$
0 mult 2, 4 mult 2
4. $9x(x^2 - 9)$
 $9x(x - 3)(x + 3)$
0 mult 1
3 mult 1
-3 mult 1
5. $(x + 1)(x - 3)(x - 4)$
 $x^3 - 6x^2 + 5x + 12$
6. $(x - 1)^2(x - 2)$
 $x^3 - 4x^2 + 5x - 2$
7. $x^2(x + 3)(x - 5)$
 $x^4 - 2x^3 - 15x^2$
8. $(x + 2)^3$
 $x^3 + 6x^2 + 12x + 8$

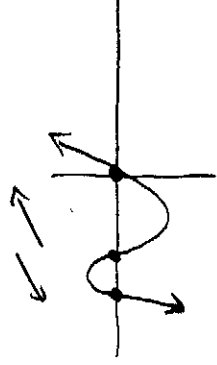
$$2x(x^2 + 5x + 6)$$

$$9. x(2x^2 + 10x + 12)$$

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

$$z: 0 \quad -2 \quad -3$$

$$m: 1 \quad 1 \quad 1$$

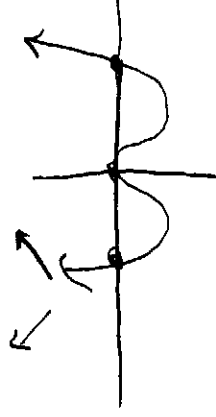


$$10. x^2(x^2 - x - 6)$$

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

$$z: 0 \quad 3 \quad -2$$

$$m: 2 \quad 1 \quad 1$$

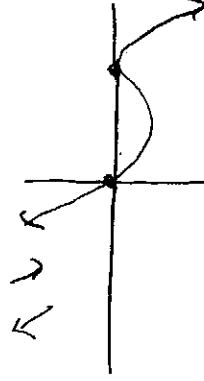


$$11. -3x(x^2 - 6x + 9)$$

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

$$z: 0 \quad 3$$

$$m: 1 \quad 2$$



6.3

$$1. \begin{array}{r} -4 \end{array} \begin{array}{r} 1 \quad 3 \quad -10 \quad -24 \\ -4 \quad 4 \quad 24 \\ \hline 1 \quad -1 \quad -6 \quad 0 \end{array} \text{ yes}$$

$$3. \begin{array}{r} x-5 \end{array} \begin{array}{r} 2x^2+11x+43 \\ 2x^2+x-7 \\ \hline 10x+50 \\ 10x+50 \\ \hline 0 \end{array} \text{ yes}$$

$$2x^2 - 10x$$

$$11x - 7$$

$$11x + 55$$

$$48$$

$$5. \begin{array}{r} x+2 \end{array} \begin{array}{r} 3x^2-7x+7 \\ 3x^2-x^2-7x+6 \\ \hline 2x^2-6x+1 \\ 2x^2-6x+1 \\ \hline 0 \end{array} \text{ yes}$$

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

$$-7x^2 - 7x$$

$$-7x^2 - 14x$$

$$7x + 6$$

$$7x + 14$$

$$-8$$

$$2. \begin{array}{r} 3 \end{array} \begin{array}{r} 1 \quad 3 \quad -10 \quad -24 \\ 3 \quad 18 \quad 24 \\ \hline 1 \quad 6 \quad 8 \quad 0 \end{array} \text{ yes}$$

$$4. \begin{array}{r} x-1 \end{array} \begin{array}{r} x^2+6x+3 \\ x^2+5x^2-3x-1 \\ \hline x^2-x^2 \\ 6x^2-3x \\ 6x^2-6x \\ \hline 3x-1 \\ 3x-3 \\ \hline 2 \end{array}$$

$$6. \begin{array}{r} 5 \end{array} \begin{array}{r} 1 \quad -8 \quad 17 \quad -10 \\ 5 \quad -15 \quad 10 \\ \hline 1 \quad -3 \quad 2 \quad 0 \end{array}$$

$$x^2 - 3x + 2$$

$$7. \begin{array}{r} 2 \overline{) 1 \ 5 \ -1 \ -9} \\ \underline{1 \ 3 \ -7 \ 5} \\ 2 \end{array}$$

$$x^2 + 3x - 7 + \frac{5}{x+2}$$

$$8. \begin{array}{r} 2 \overline{) 3 \ -4 \ -5 \ 1} \\ \underline{6 \ 4 \ -2} \\ 3 \end{array}$$

$$9. \begin{array}{r} 3 \overline{) 1 \ 6 \ 10 \ 3} \\ \underline{-3 \ -9 \ -3} \\ 1 \ 3 \ 1 \ 0 \end{array}$$

$$10. \begin{array}{r} 5 \overline{) 1 \ 3 \ -13 \ -15} \\ \underline{-5 \ 10 \ 15} \\ 1 \ -2 \ -3 \ 0 \end{array}$$

$$x^2 - 2x - 3$$

$$(x-3)(x+1)(x+5)$$

$$11. \begin{array}{r} 2 \overline{) 1 \ -3 \ -10 \ 24} \\ \underline{2 \ -2 \ -24} \\ 1 \ -1 \ -12 \ 0 \end{array}$$

$$x^2 - x - 12$$

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

$$12. \begin{array}{r} 4 \overline{) 6 \ 2 \ -11 \ 12} \\ \underline{-8 \ 8 \ -4} \\ 6 \ -6 \ -3 \ 8 \end{array}$$

$$6x^2 - 6x - 3 + \frac{8}{x+4}$$

$$13. \begin{array}{r} 1 \overline{) 1 \ 2 \ 0 \ 1 \ -3} \\ \underline{1 \ 3 \ 3 \ 4} \\ 1 \ 3 \ 3 \ 4 \ .1 \end{array}$$

$$x^3 + 3x^2 + 3x + 4 - \frac{1}{x-1}$$

$$14. \begin{array}{r} 2 \overline{) 1 \ 0 \ -3 \ 0 \ -10} \\ \underline{2 \ 4 \ 2 \ 4} \\ 1 \ 2 \ 1 \ 2 \ -4 \end{array}$$

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

$$15. \begin{array}{r} 8 \overline{) 1 \ -16 \ 79 \ -120} \\ \underline{8 \ -64 \ 120} \\ 1 \ -8 \ 15 \ 0 \end{array}$$

$$x^2 - 8x + 15$$

$$(x-5)(x-3)$$

width $(x-3)$
height $(x-5)$

6.4

$$1. \frac{(2x-3)(4x^2+6x+9)}{x=3/2} \quad \frac{-6 \pm \sqrt{36-144}}{2(4)}$$

$$\frac{-6 \pm \sqrt{-108}}{8}$$

$$\frac{-6 \pm 6\sqrt{3}i}{8}$$

$$\frac{-3 \pm 3\sqrt{3}i}{4}$$

$$2. \frac{(x+4)(x-4x+16)}{x=-4} \quad \frac{4 \pm \sqrt{16-64}}{2}$$

$$\frac{4 \pm \sqrt{-48}}{2}$$

$$\frac{4 \pm 4\sqrt{3}i}{2}$$

$$2 \pm 2\sqrt{3}i$$

$$3. (x^2-4)(x^2-1)=0$$

$$\frac{(x-2)(x+2)(x-1)(x+1)=0}{x=2 \mid x=-2 \mid x=1 \mid x=-1}$$

$$4. \frac{(x^2-8)(x^2-2)=0}{x^2=8 \mid x^2=2}$$

$$x=\pm\sqrt{8} \quad x=\pm\sqrt{2}$$

$$x=\pm 2\sqrt{2}$$

$$5. (x^2-9)(x^2+4)=0$$

$$\frac{(x-3)(x+3)(x^2+4)=0}{x=3 \mid x=-3 \mid x=\pm 3i}$$

$$6. x^2(x+4)+7(x+4)=0$$

$$\frac{(x^2+7)(x+4)=0}{x=\pm\sqrt{7} \mid x=-4}$$

$$7. -4.76, -1.4, 1.66$$

$$8. -.37, .95, +2 \text{ imaginary}$$

$$9. 0 \text{ mult } 2, -2/3, 7/5$$

$$6.5 \quad 1. 2-3i$$

$$-\sqrt{7}$$

$$2. 3+\sqrt{2}$$

$$1-\sqrt{3}$$

$$3. 4i$$

$$6+i$$

$$4. 5+\sqrt{6}$$

$$-2-\sqrt{10}$$

$$5. 2x^4 - 9x^2 + 4 = 0$$

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

$$\begin{array}{r|rrrr} -2 & 2 & 0 & -9 & 0 & +4 \\ & & -4 & 8 & 2 & -4 \\ \hline & 2 & -4 & -1 & 2 & 0 \\ 2 & 2 & 4 & 0 & -2 & \\ \hline & 2 & 0 & -1 & 0 & \end{array}$$

$$2x^2 - 1 = 0$$

$$2x^2 = 1$$

$$x^2 = \frac{1}{2}$$

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

$$\boxed{2, -2, \pm \frac{1}{\sqrt{2}}}$$

$$(x^2 - 4)(2x^2 - 1) = 0$$

$$(x^2 - 4)(x + 2)(2x^2 - 1) = 0$$

$$OK \quad x = 2 \quad | \quad x = -2 \quad | \quad 2x^2 = 1$$

$$x^2 = \frac{1}{2}$$

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

$$6. x^3 - 5x^2 + 2x + 8 = 0$$

$$p/q = \pm 1, \pm 2, \pm 4, \pm 8$$

$$calc \Rightarrow -1, 2, 4$$

$$\begin{array}{r|rrrr} -1 & 1 & -5 & 2 & 8 \\ & & -1 & 6 & -8 \\ \hline & 1 & -6 & 8 & 0 \quad \checkmark \\ 2 & 1 & -6 & 2 & -8 \\ \hline & 1 & -4 & 0 & \checkmark \\ 4 & 1 & 4 & 0 & \checkmark \\ \hline & 1 & 0 & \checkmark & \end{array}$$

$$\boxed{-1, 2, 4}$$

$$7. 2x^3 + 13x^2 + 17x - 12 = 0$$

$$p/q = \pm 1, \pm \frac{1}{2}, \pm 2, \pm 3, \pm \frac{3}{2}, \pm 4, \pm 6, \pm 12$$

$$calc \rightarrow -4, -3, \frac{1}{2}$$

$$\begin{array}{r|rrrr} -4 & 2 & 13 & 17 & -12 \\ & & -8 & -20 & 12 \\ \hline & 2 & 5 & -3 & 0 \quad \checkmark \\ -3 & 2 & -6 & 3 & \\ \hline & 2 & -1 & 0 & \checkmark \\ x & 2 & 0 & \checkmark & \\ \hline & 2 & 0 & \checkmark & \end{array}$$

$$\boxed{-4, -3, \frac{1}{2}}$$

$$8. 6x^3 + 10x^2 + 5x - 20 = 0$$

$$x(6x^2 + 10x + 5) = 0$$

$$x = 0 \quad | \quad -10 \pm \sqrt{100 - 4(6)(5)}$$

$$2(6)$$

$$\frac{-10 \pm \sqrt{-20}}{12}$$

$$\boxed{\frac{-5 \pm \sqrt{5}i}{6}, 0}$$

$$p/q = \pm 1, \pm \frac{1}{6}, \pm 5, \pm \frac{5}{6}, 0$$

9. $(x-5)(x-2i)(x+2i)$
 $(x-5)(x^2+4)$
 $x^3-5x^2+4x-20$

6.6 1. $y = -4x^3 + 100x$
 $0 = -4x(x^2-25)$

$-4x(x-5)(x+5)$
 $x=0 \mid x=5 \mid x=-5$
 $(0, 5, -5)$

10. $(x+7)(x-i)(x+i)$
 $(x+7)(x^2+1)$
 x^3+7x^2+x+7

2. $f(x) = x^3 + 3x^2 + 6x + 4$
 $p/g = \pm 1, \pm 2, \pm 4$
 $\text{calc} \rightarrow -1, \pm 2i \text{ max}$

$-1 \mid 1 \quad 3 \quad 6 \quad 4$
 $\quad \quad -1 \quad -2 \quad -4$
 $\quad \quad 1 \quad 2 \quad 4 \quad 0$

$x^2 + 2x + 4$

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

$\frac{-2 \pm \sqrt{-12}}{2}$

$\frac{-2 \pm 2\sqrt{3}i}{2}$

$-1 \pm \sqrt{3}i, -1$

3. $y = x^3 - 4x^2 + 8$

$p/g \Rightarrow \pm 1, \pm 2, \pm 4, \pm 8$

$\text{calc} \rightarrow 2 + 2i \text{ irrational}$

$2 \mid 1 \quad -4 \quad 0 \quad 8$
 $\quad \quad 2 \quad -4 \quad -8$
 $\quad \quad -2 \quad -4 \quad 0$

$x^2 - 2x - 4$

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

$\frac{2 \pm \sqrt{20}}{2}$

$\frac{2 \pm 2\sqrt{5}}{2}$

$1 \pm \sqrt{5}, 2$

4. $f(x) = x^3 - 9x^2 + 27x - 27$

$p/g \Rightarrow \pm 1, \pm 3, \pm 9, \pm 27$

$\text{calc} \rightarrow 3$

$3 \mid 1 \quad -9 \quad 27 \quad -27$
 $\quad \quad 3 \quad -18 \quad 27$
 $\quad \quad 1 \quad -6 \quad 9 \quad 0$

$x^2 - 6x + 9$

$(x-3)(x-3)$

$3 - \text{mult } 3$