

WS 3.1-3.4 Review

1. $B(y) = 4y^2 + y$ $T(y)$: Total # of Leaves
 $L(y) = 2y^3 + 3y^2 + y$

$$T(y) = B(y) \cdot L(y)$$

$$= (4y^2 + y)(2y^3 + 3y^2 + y)$$

$$= 8y^5 + 12y^4 + 4y^3 + 2y^4 + 3y^3 + y^2$$

$$T(y) = 8y^5 + 14y^4 + 7y^3 + y^2$$

2. Average = $\frac{d(t)}{p(t)}$

$$t^2 + 0t + 100 \quad \Big| \quad \begin{array}{r} 2t + 10 \\ 2t^3 + 10t^2 + 200t + 10000 \\ - 2t^3 + 0t^2 + 200t \\ \hline 10t^2 + 10000 \\ - 10t^2 + 10000 \\ \hline \end{array}$$

3. $V(t) = (t^3 - 4t^2 - 25t + 100)$
 $t^2(t-4) - 25(t-4)$
 $(t-4)(t^2 - 25)$

$V(t) = (t-4)(t+5)(t-5)$ { The voltage is equal to zero at 4 seconds and 5 seconds }

4. $(3x^4 - 9x^3 + 5x^2 - x + 7) + P(x) = 3 + 4x^4 + 3x - x^3 + 3x^2$
 $- 3x^4 + 9x^3 - 5x^2 + x - 7 \quad \quad - 7 - 3x^4 + x + 9x^3 - 5x^2$

$$P(x) = x^4 + 8x^3 - 2x^2 + 4x - 4$$

5. $5x^3 - 12x - x^2 + 9 - 12x^5 - 6x^4 - P(x) = 19 + 8x^3 - 18x - 19x^5 - 2x^2 - 8x$
 $- 5x^3 + 12x + x^2 - 9 + 12x^5 + 6x^4 \quad \quad - 9 - 5x^3 + 12x + 12x^5 + x^2 + 6x$
 $- P(x) = -7x^5 - 2x^4 + 3x^3 - x^2 - 6x + 10$

so $P(x) = 7x^5 + 2x^4 - 3x^3 + x^2 + 6x - 10$

$$6. \quad \left(\frac{1}{3}x+4\right)^3$$

$$\left(\frac{1}{3}x+4\right)\left(\frac{1}{9}x^2+\frac{8}{3}x+16\right)$$

$$\frac{1}{27}x^3+\frac{8}{9}x^2+\frac{16}{3}x$$

$$+\frac{4}{9}x^2+\frac{32}{3}x+64$$

$$\boxed{\frac{1}{27}x^3+\frac{4}{3}x^2+16x+64}$$

$$7. \quad (4x-5)(2x^5+x^3-1)$$

$$8x^6+4x^4-4x-10x^5-5x^3+5$$

$$\boxed{8x^6-10x^5+4x^4-5x^3-4x+5}$$

$$8. \quad \begin{array}{r} \boxed{x^2+15x+45+131/x-3} \\ x-3 \overline{) x^3+12x^2+0x-4} \\ \underline{-x^3+3x^2} \\ 15x^2+0x \\ \underline{-15x^2+45x} \\ 45x-4 \\ \underline{+45x+135} \\ 131 \end{array}$$

$$9. \quad \begin{array}{r} \boxed{4x^3+9x^2+5+9/3x-1} \\ 3x-1 \overline{) 12x^4+23x^3-9x^2+15x+4} \\ \underline{-12x^4+4x^3} \\ 27x^3-9x^2 \\ \underline{-27x^3+9x^2} \\ 15x+4 \\ \underline{-15x+5} \\ 9 \end{array}$$

$$10. \quad \frac{(25x^3+30x+40)}{5} \div (5x+10) \rightarrow (5x^3+6x+8) \div (x+2)$$

$$\begin{array}{r} -2 \overline{) 5 \quad 0 \quad 6 \quad 8} \\ \underline{-10 \quad 20 \quad -52} \\ 5 \quad -10 \quad 26 \quad -44 \end{array}$$

$$\boxed{5x^2-10x+26-44/x+2}$$

11. $(x^4 - \frac{1}{16}) \div (2x-1) \rightarrow (\frac{x^4}{2} - \frac{1}{32}) \div (x - \frac{1}{2})$

$$\begin{array}{r|rrrrr} \frac{1}{2} & \frac{1}{2} & 0 & 0 & 0 & -\frac{1}{32} \\ & & \frac{1}{4} & \frac{1}{8} & \frac{1}{16} & \frac{1}{32} \\ \hline & \frac{1}{2} & \frac{1}{4} & \frac{1}{8} & \frac{1}{16} & 0 \end{array}$$

$$\boxed{\frac{1}{2}x^3 + \frac{1}{4}x^2 + \frac{1}{8}x + \frac{1}{16}}$$

12. $\begin{array}{r|rrrr} 3 & 4 & -9 & 2 \\ & & 12 & 9 \\ \hline & 4 & 3 & 11 \end{array}$

$$\boxed{P(3) = 11}$$

13. $\begin{array}{r|rrrrr} -2 & -3 & 5 & 0 & -1 & 7 \\ & & 6 & -22 & 44 & -86 \\ \hline & -3 & 11 & -22 & 43 & -79 \end{array}$

$$\boxed{P(-2) = -79}$$

14. $\begin{array}{r|rrrr} -5 & 2 & 6 & -20 \\ & & -10 & 20 \\ \hline & 2 & -4 & 0 \end{array}$

$$\boxed{P(x) = (x+5)(2x-4)}$$

15. $\begin{array}{r|rrrrr} 1 & 1 & -6 & 4 & 0 & 1 \\ & & 1 & -5 & -1 & -1 \\ \hline & 1 & -5 & -1 & -1 & 0 \end{array}$

$$\boxed{P(x) = (x-1)(x^3 - 5x^2 - x - 1)}$$

16. $\begin{array}{r|rrrr} -2 & 3 & 12 & 17 & 10 \\ & & -6 & -12 & -10 \\ \hline & 3 & 6 & 5 & 0 \end{array}$

$$\boxed{P(x) = (x+2)(3x^2 + 6x + 5)}$$

17. $\begin{array}{r|rrrr} 8 & 1 & -8 & -4 & 33 & -8 \\ & & 8 & 0 & -32 & 8 \\ \hline & 1 & 0 & -4 & 1 & 0 \end{array}$

$$\boxed{P(x) = (x-8)(x^3 - 4x + 1)}$$

$$18. \quad (16x^3 - 12x^2)(20x - 15) \\ 4x^2(4x - 3) + 5(4x - 3) \\ \boxed{(4x^2 + 5)(4x - 3)}$$

$$19. \quad 3x^6 + 54x^4 + 243x^2 \\ 3x^2(x^4 + 18x^2 + 81) \\ \boxed{3x^2(x^2 + 9)^2}$$

$$20. \quad x^6 - 10x^5 + 25x^4 \\ x^4(x^2 - 10x + 25) \\ \boxed{x^4(x - 5)^2}$$

$$21. \quad 6x^3 + 12x^2 + 4x + 8 \\ 2(3x^3 + 6x^2 + 2x + 4) \\ 2[3x^2(x + 2) + 2(x + 2)] \\ \boxed{2(x + 2)(3x^2 + 2)}$$

$$22. \quad 250x^4 + 54x \\ 2x(125x^3 + 27) \quad a: 5x, b: 3 \\ \boxed{2x(5x + 3)(25x^2 - 15x + 9)}$$

$$23. \quad -3x^5 + 24x^2 \\ -3x^2(x^3 - 8) \quad a: x, b: 2 \\ \boxed{-3x^2(x - 2)(x^2 + 2x + 4)}$$