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

2. $f(x) = x^4 - 2x^3 + x^2 - 18x - 72$

3. $x^8 - 7x^7 + 5x^6 - 4x^2 + 28x - 20$

4. $3x^2 + 4x + 5 + \dfrac{5x - 6}{x^2 - 2x + 1}$

5. $2x^2 - 7x + 19 - \dfrac{39}{x + 2}$

6. $8x^3 + 36x^2 + 54x + 27$

7. **a.** Each function has one zero repeated four times; The zero for f is 0 and the zero for g is 3.

b. The graph of g is a translation 3 units right of the graph of f.

c. g is increasing when $x > 3$ and decreasing when $x < 3$.

8. **a.** The Rational Root Theorem states that all possible rational zeros of $V(x)$ will be of the form $\dfrac{\text{factors of } 10}{\text{factors of } 1}$. Because 4 is not a factor of 10, 4 is not a possible rational zero of $V(x)$.

b.

1	1	2	−13	10
		1	3	−10
	1	3	−10	0

$V(x) = (x - 1)(x + 5)(x - 2)$

c. The aquarium is 1.31 feet by 7.31 feet by 0.31 foot.

9. yes; Because $(-b)^2 = b^2$, the expression $1a^2 + 2a(-b) + 1(-b)^2$ simplifies to $a^2 - 2ab + b^2$.

10. no; Synthetic division can only be used when the divisor is a linear binomial.

11. **a.** $S = 37t^4 - 660t^3 + 5900t^2 - 13{,}400t + 17{,}900$

b. neither; The function is not odd because $S(-x) \neq -S(x)$, and the function is not even because $S(-x) \neq S(x)$

12. $p = t^3 - 3t^2 + 6$; 202 dollars