1. a. \(f(0) = 0, \quad f(2) = 10, \quad g(-2) = -4, \quad g(3) = 1\)
b. \(f(g(t)) = 2t^2 - 7t + 6, \quad g(f(t)) = 2t^2 + t - 2\)
c. \(f(g(1)) = 1, \quad g(f(1)) = 1\)

2. a. Range \(y \leq \frac{121}{4} = 30.25\)
b. Domain \(-5 < x < 6\)

3. \(x = -5, -3\)

4. \(x = -2 \pm \sqrt{7}\)

5. \(x = \frac{1}{2}, 1\)

6. \(x = -4, 5\)

7. \(x = -\frac{3}{2} \pm \frac{\sqrt{25}}{2}\)

8. \(x = -3, 3\)

9. \(x = 0, \frac{5}{2}\)

10. No Solution

11. For \(f(t)\), \(t\)-intercepts, \(t = \pm 2\), \(y\)-intercept, \(y = 4\), vertex \((0, 4)\). For \(g(t)\), \(t\)-intercept, \(t = 2\), \(y\)-intercept, \(y = -2\), slope \(m = 1\). Points of intersection, \((-3, -5)\), \((2, 0)\).

12. For \(f(x)\), \(x\)-intercepts, \(x = -2\), \(y\)-intercept, \(y = 4\), vertex \((-2, 0)\). For \(g(x)\), \(x\)-intercept, \(x = 2\), \(y\)-intercept, \(y = 4\), slope \(m = -2\). Points of intersection, \((0, 4)\), \((-6, 16)\).
13. a. Graph of $h(t)$ vs $t$ is a parabola.

\[ h(t) = \frac{1}{2}at^2 + bt + c \]

b. Maximum height at $t = 1.5$ sec with $h(1.5) = 100$. The ball hits the ground at $t = 4$ sec.

14. A 0.1N solution of acetic acid has $[H^+] = 0.001314$, which is equivalent to a pH of 2.881. A 1N solution of acetic acid has $[H^+] = 0.004175$, which is equivalent to a pH of 2.379.

15. a. $y = 20 - x$.

b. $A(x) = 20x - x^2$.

c. $x = 10$ produces the largest area with $A(10) = 100$. This is a square.

16. Braking distance at 60 mph is $d(60) = 240$ ft. To have a braking distance less than 75 ft, then the velocity satisfies $0 \leq v < 30$. 
17. a. The sketch of the graph is a parabola.

b. The equilibrium populations are \( P_e = 0 \) or 800 (individuals).

c. The maximum growth occurs when \( P = 400 \), which has a growth rate of \( g(400) = 4 \) (individuals/generation).

18. a. The sum of squares error formula is \( J(m) = 30m^2 - 118.4m + 116.85 \). The vertex is at \( (1.9733, 0.02867) \), giving the best slope as \( m = 1.9733 \) and the least sum of squares error as \( J(1.9733) = 0.02867 \).

b. When \( A = 3.5 \), then \( c = 1.774 \). When \( A = 6.2 \), then \( c = 3.142 \).

19. a. The sum of squares error formula is \( J(k) = 548 - 182k + 15.14k^2 \). The vertex is at \( (6.01, 1.038) \), giving the best slope as \( m = 6.01 \) and the least sum of squares error as \( J(6.01) = 1.038 \).

b. Using the best slope in the model, we see that her great-grandfather has a height of \( d = 6.01 \) ft, so her mother has the better memory.