

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

2. a. Range $y \leq 121/4 = 30.25$
 b. Domain $-5 < x < 6$

3. $x = -5, -3$

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

5. $x = \frac{1}{2}, 1$

6. $x = -4, 5$

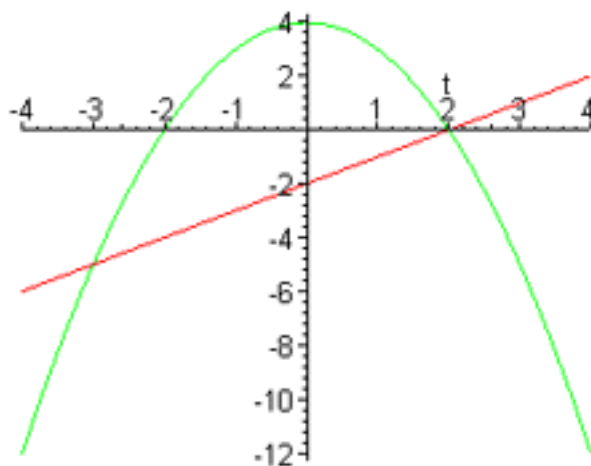
7. $x = -\frac{3}{2} \pm \frac{\sqrt{29}}{2}$

8. $x = -3, 3$

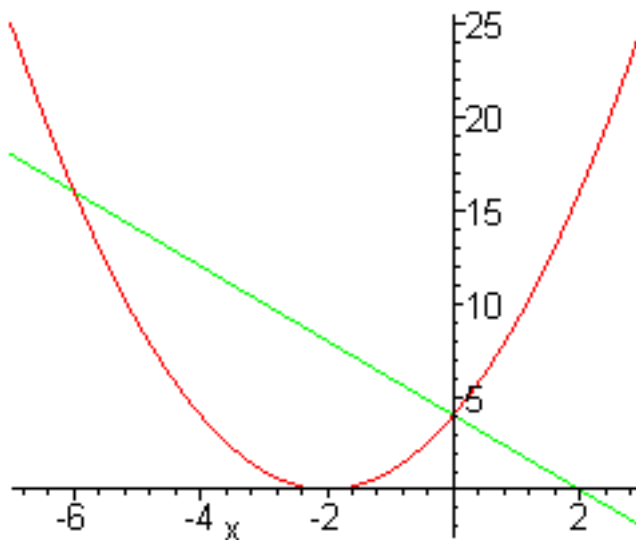
9. $x = 0, \frac{5}{2}$

10. No Solution

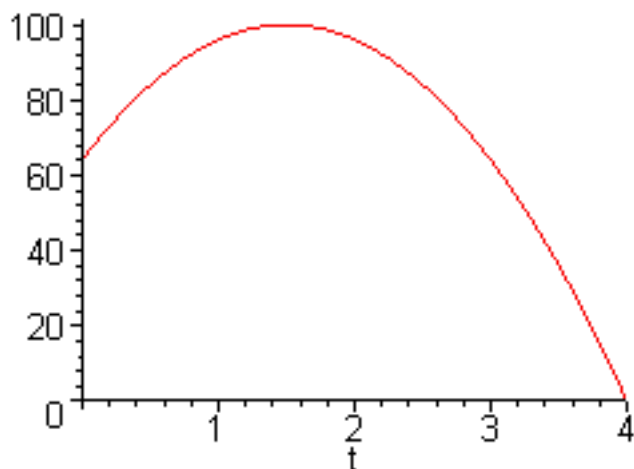
11. For $f(t)$, t -intercepts, $t = \pm 2$, y -intercept, $y = 4$, vertex $(0, 4)$. For $g(t)$, t -intercept, $t = 2$, y -intercept, $y = -2$, slope $m = 1$. Points of intersection, $(-3, -5)$, $(2, 0)$.



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.



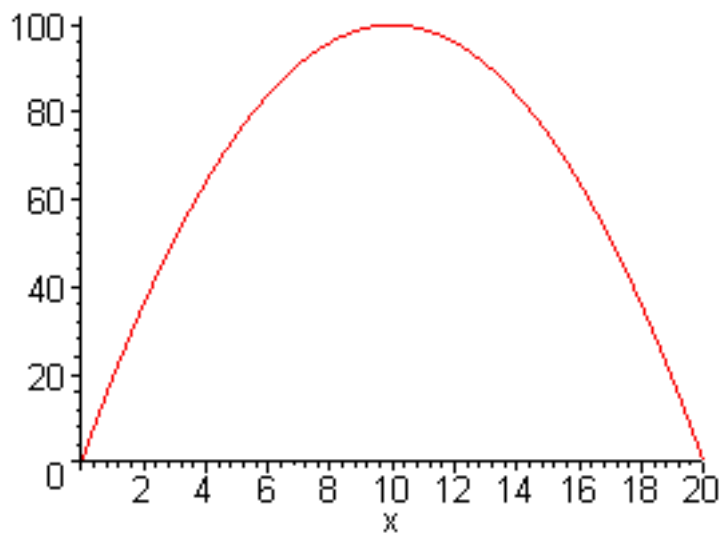
- b. Maximum height at $t = 1.5$ sec with $h(1.5) = 100$. The ball hits the ground at $t = 4$ sec.

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. $y = 20 - x$.

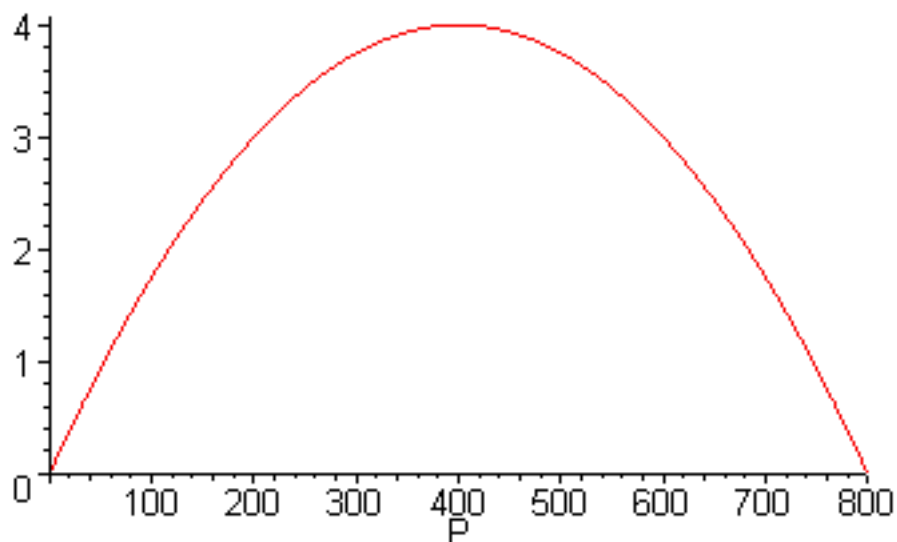
b. $A(x) = 20x - x^2$.

- 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.