

2. Consider the functions $f(x) = x^2 + 4x + 9$ and $g(x) = x^2 + 3x + 6$.

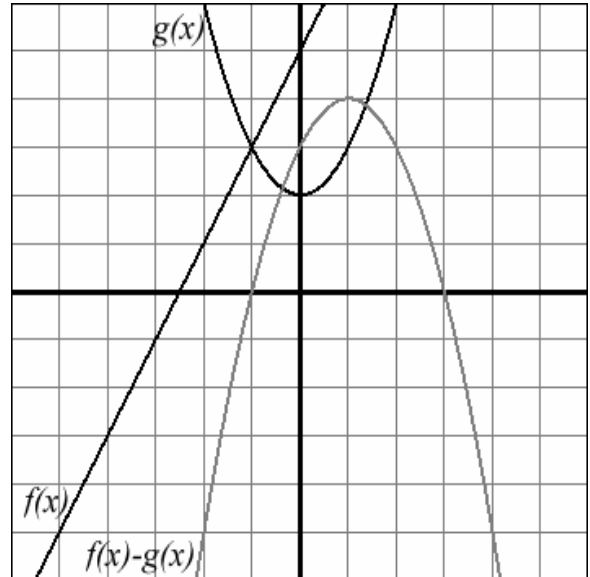
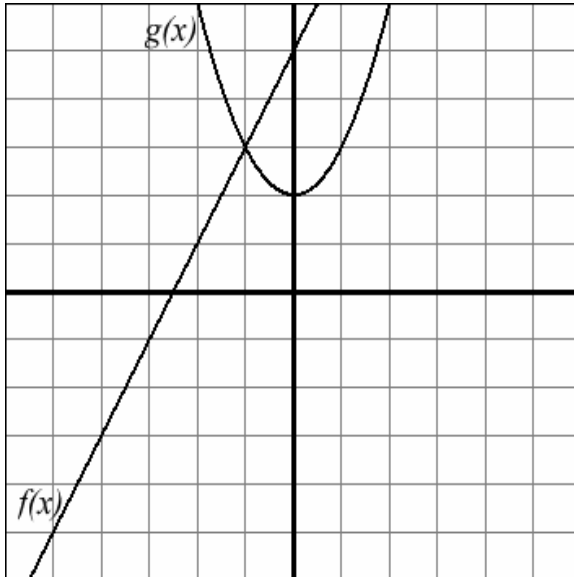
a. Find a formula for $h(x)$, where $h(x) = f(x) - g(x)$.

b. At what x values does $h(x) = 0$?

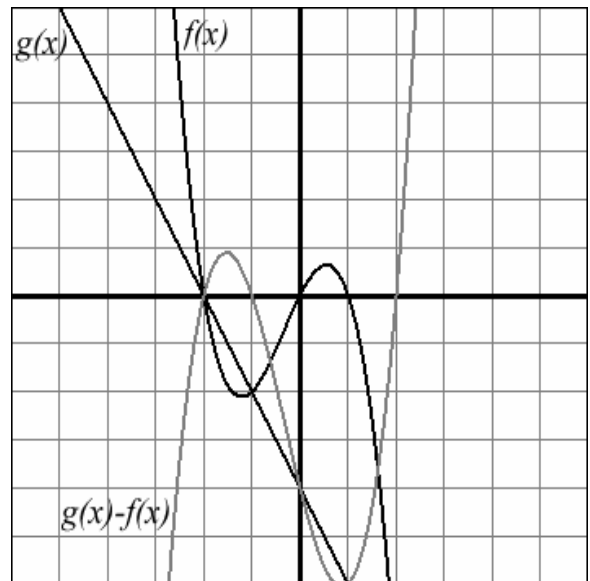
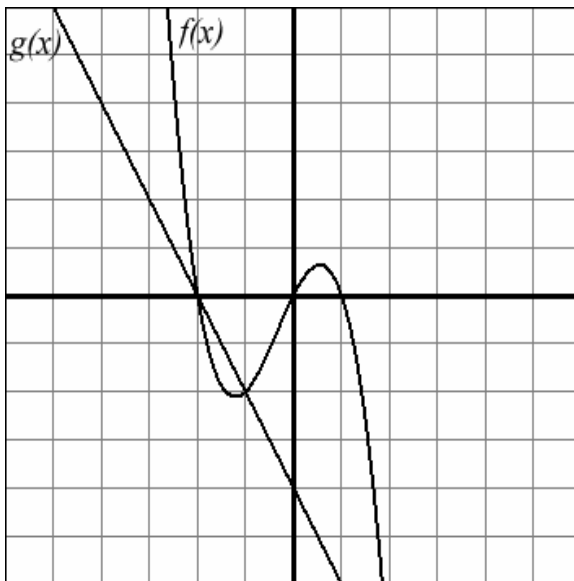
c. Find the solutions to the equation $f(x) = g(x)$. Explain how you get your answer.

d. Why are the answers to **b** and **c** related?

3. a. The graphs below show a pair of functions $f(x)$ and $g(x)$, along with their difference $f(x) - g(x)$. Find the solution(s) to the equation $f(x) = g(x)$. Explain your reasoning.



- b. The graphs below show another pair of functions $f(x)$ and $g(x)$, along with their difference $g(x) - f(x)$. Find the solution(s) to the equation $f(x) = g(x)$. Explain your reasoning.



4. The circus has an act where two clowns are shot from cannons. When the ringmaster presses her stopwatch, Clown Walter is shot from a cannon. Clown Walter's height in feet after t seconds is given by:

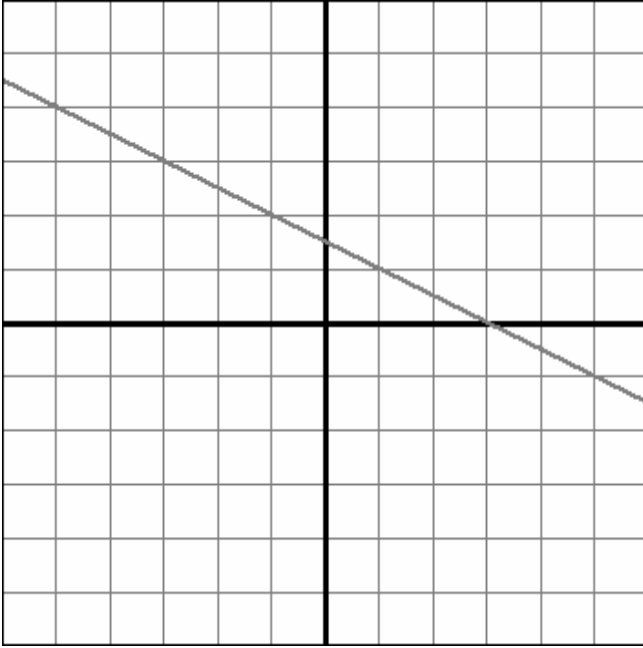
$$W(t) = -16t^2 + 112t$$

Two seconds later, Clown Todd is shot from another cannon. His flight is described by:

$$T(t) = -16t^2 + 160t - 256$$

- a. Evaluate $W(0)$ and $T(2)$. Are these values what you would have expected?
- b. On the next page, fill in the tables for $W(t)$ and $T(t)$, then graph both functions on the given grid.
- c. At what time(s) will Walter and Todd be at the same height off of the ground?
- d. At what time(s) will Todd be higher off the ground than Walter?
- e. On the next page, fill in the table for $T(t) - W(t)$, then graph this function on the same grid. What do the values of this function represent, in terms of the clowns?
- f. When is $T(t) - W(t)$ positive, when is it zero, and when is it negative? Compare with your answer to parts c and d.

5. For two functions $f(x)$ and $g(x)$, a graph of their difference $f(x) - g(x)$ is shown on the grid.



- a. How many solutions does the equation $f(x) = g(x)$ have?

- b. For what interval of x values is $f(x) > g(x)$?

- c. On the grid, draw possible graphs for $f(x)$ and $g(x)$.