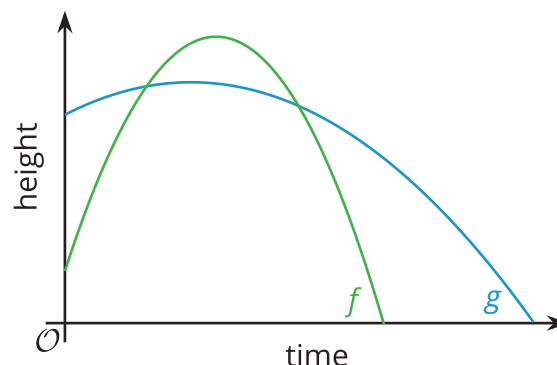


Lesson 14 Practice Problems

1. Here are graphs of functions f and g .

Each represents the height of an object being launched into the air as a function of time.



- Which object was launched from a higher point?
 - Which object reached a higher point?
 - Which object was launched with the higher upward velocity?
 - Which object landed last?
2. *Technology required.* The function h given by $h(t) = (1 - t)(8 + 16t)$ models the height of a ball in feet, t seconds after it was thrown.
- Find the zeros of the function. Show or explain your reasoning.
 - What do the zeros tell us in this situation? Are both zeros meaningful?
 - From what height is the ball thrown? Explain your reasoning.
 - About when does the ball reach its highest point, and about how high does the ball go? Show or explain your reasoning.
3. The height in feet of a thrown football is modeled by the equation $f(t) = 6 + 30t - 16t^2$, where time t is measured in seconds.
- What does the constant 6 mean in this situation?
 - What does the $30t$ mean in this situation?
 - How do you think the squared term $-16t^2$ affects the value of the function f ? What does this term reveal about the situation?

4. The height in feet of an arrow is modeled by the equation $h(t) = (1 + 2t)(18 - 8t)$, where t is seconds after the arrow is shot.

a. When does the arrow hit the ground? Explain or show your reasoning.

b. From what height is the arrow shot? Explain or show your reasoning.

5. Two objects are launched into the air.

○ The height, in feet, of Object A is given by the equation $f(t) = 4 + 32t - 16t^2$.

○ The height, in feet, of the Object B is given by the equation $g(t) = 2.5 + 40t - 16t^2$. In both functions, t is seconds after launch.

a. Which object was launched from a greater height? Explain how you know.

b. Which object was launched with a greater upward velocity? Explain how you know.

6. a. Predict the x - and y -intercepts of the graph of the quadratic function defined by the expression $(x + 6)(x - 6)$. Explain how you made your predictions.

b. *Technology required.* Check your predictions by graphing $y = (x + 6)(x - 6)$.

(From Unit 6, Lesson 10.)

7. *Technology required.* A student needs to get a loan of \$12,000 for the first year of college. Bank A has an annual interest rate of 5.75%, Bank B has an annual interest rate of 7.81%, and Bank C has an annual rate of 4.45%.
- If we graph the amount owed for each loan as a function of years without payment, predict what the three graphs would look like. Describe or sketch your prediction.
 - Use graphing technology to plot the graph of each loan balance.
 - Based on your graph, how much would the student owe for each loan when they graduate from college in four years?
 - Based on your graph, if no payments are made, how much would the student owe for each loan after 10 years?

(From Unit 5, Lesson 15.)

8. *Technology required.* The functions f and g are given by $f(x) = 13x + 6$ and $g(x) = 0.1 \cdot (1.4)^x$.
- Which function eventually grows faster, f or g ? Explain how you know.
 - Use graphing technology to decide when the graphs of f and g meet.

(From Unit 5, Lesson 19.)