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Lesson 2: Flipping Ferraris

Ready, Set, Go



Ready

Solve for x .

1. $17 = 5x + 2$

2. $2x^2 - 5 = 3x^2 - 12x + 31$

3. $11 = \sqrt{2x + 1}$

4. $\sqrt{x^2 + x - 2} = 2$

5. $-4 = \sqrt[3]{5x + 1}$

6. $\sqrt[3]{352} = \sqrt[3]{7x^2 + 9}$

7. $3^x = 243$

8. $5^x = \frac{1}{125}$

9. $4^x = \frac{1}{32}$



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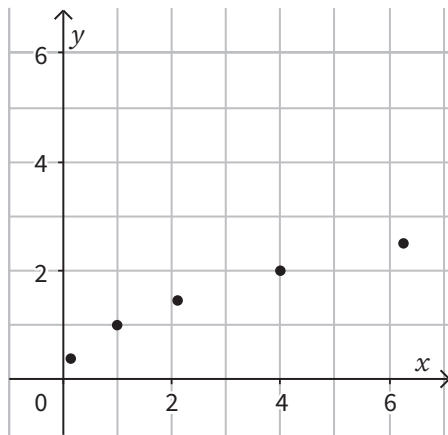
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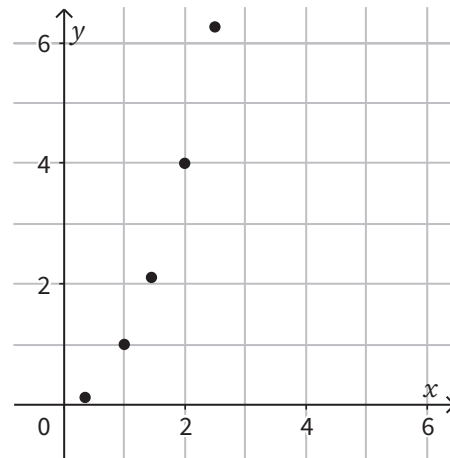
**Set**

- 10.** Students were given a set of data to graph. After they had completed their graphs, all students shared their graphs with their partners. When Ethan and Emma saw each other's graphs, they exclaimed together, "Your graph is wrong!" Neither graph is wrong. Explain what Ethan and Emma have done with their data.

Ethan's graph:



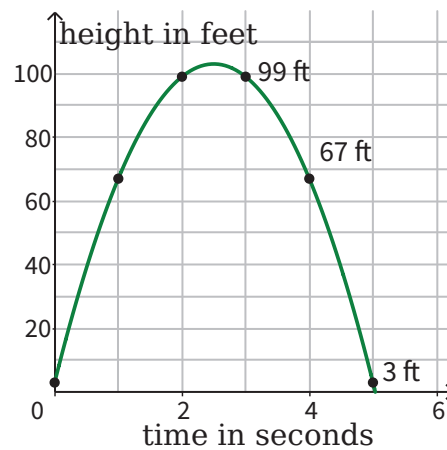
Emma's graph:



- 11.** Describe a sequence of transformations that would take Ethan's graph onto Emma's graph.

- 12.** A baseball is hit upward from a height of 3 feet with an initial velocity of 80 feet per second (about 55 mph). The graph shows the height of the ball at any given second during its flight.

Use the graph to answer the following questions.



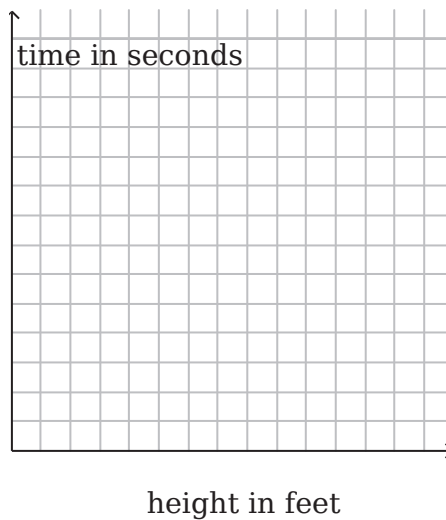


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- Approximate the time that the ball is at its maximum height.
- Approximate the time that the ball hits the ground.
- At what time is the ball 67 feet above the ground?
- Make a new graph that shows the time when the ball is at the given heights.



- The new graph is the inverse of the time vs height graph, but it is not a function. How would you restrict the domain on the original function to make it invertible?



The functions are defined:

- $f(x) = 3x$
- $g(x) = 10x + 4$
- $h(x) = x^2 - x$

Calculate the indicated function values.



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13. $f(7)$

14. $f(-9)$

15. $f(s)$

16. $f(s - t)$

17. $g(7)$

18. $g(-9)$

19. $g(s)$

20. $g(s - t)$

21. $h(7)$

22. $h(-9)$

23. $h(s)$

24. $h(s - t)$



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Notice that the notation $f(g(x))$ is indicating that you replace x in $f(x)$ with $g(x)$.

Find the following using substitution.

25. $f(g(x))$

26. $f(h(x))$

27. $g(f(x))$