

4.2 Bike Lovers

A Solidify Understanding Task



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Michelle and Rashid love going on long bike rides. Every Saturday, they have a particular route they bike together that takes four hours. Below is a piecewise function that estimates the distance they travel for each hour of their bike ride.

$$f(x) = \begin{cases} 16x, & 0 < x \leq 1 \\ 10(x - 1) + 16, & 1 < x \leq 2 \\ 14(x - 2) + 26, & 2 < x \leq 3 \\ 12(x - 3) + 40, & 3 < x \leq 4 \end{cases}$$

1. What part of the bike ride do they go the fastest? Slowest?
2. What is the domain of this function?
3. Find $f(2)$. Explain what this means in terms of the context.
4. How far have they traveled at 3 hours? Write the answer using function notation.
5. What is the total distance they travel on this bike ride?
6. Sketch a graph of the bike ride as a function of distance traveled over time.



Rashid also has a route he likes to do on his own and has the following continuous piecewise function to represent the average distance he travels in minutes:

$$f(x) = \begin{cases} \frac{1}{4}(x) & 0 < x \leq 20 \\ \frac{1}{5}(x - 20) + 5 & 20 < x \leq 50 \\ \frac{2}{7}(x - 50) + 11 & 50 < x \leq 92 \\ \frac{1}{8}(x - a) + b & 92 < x \leq 100 \end{cases}$$

7. What is the domain for this function? What does the domain tell us?
8. What is the average rate of change during the interval $[20, 50]$?
9. Over which time interval is the greatest average rate of change?
10. Find the value of each, then complete each sentence frame:
 - a. $f(30) = \underline{\hspace{2cm}}$. This means...
 - b. $f(64) = \underline{\hspace{2cm}}$. This means...
 - c. $f(10) = \underline{\hspace{2cm}}$. When finding output values for given input values in a piecewise function, you must ...
11. Find the value of a
12. Find the value of b
13. Sketch a graph of the bike ride as a function of distance traveled as a function of time.



Use the following continuous piecewise-defined function to answer the following questions.

$$f(x) = \begin{cases} \frac{1}{4}x^2 & 0 < x \leq 10 \\ \frac{1}{2}(x - 10) + c & 10 < x \leq 20 \\ 2(x - 20) + 30 & 20 < x \leq 30 \end{cases}$$

14. Find the value of c .
15. Sketch the graph.
16. What is the domain of $g(x)$?
17. What is the range of $g(x)$?
18. Find $f(8)$.
19. Find $f(15)$.

