

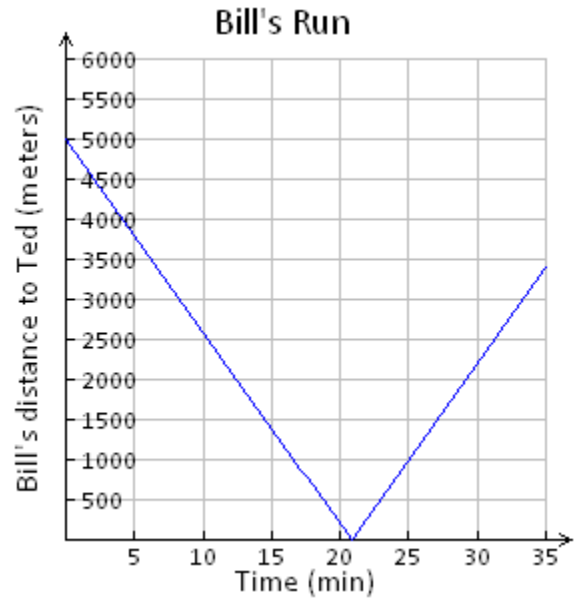
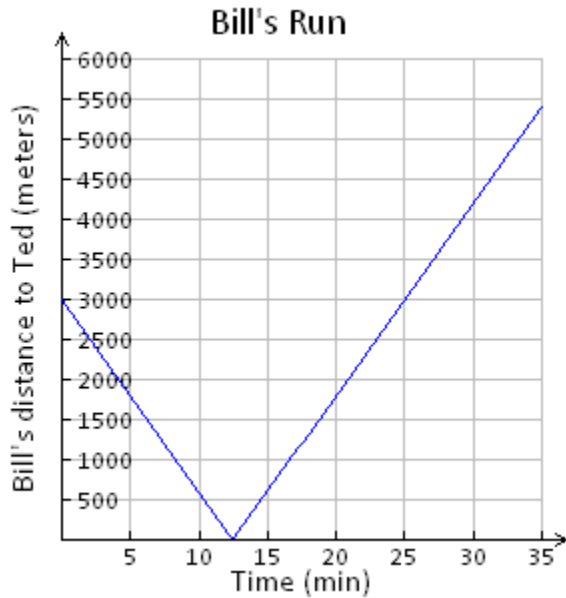


BILL'S RUN

Bill is running a 5K race (that's a 5 kilometer race). Bill's average speed is 4 meters per second. His friend Ted is standing 3 kilometers from the starting point ready to give him water as he passes.

When Bill starts running, his distance from Ted starts to decrease. Let the dependent variable be Bill's distance to Ted. The independent variable is time. Bill runs the entire 5K race.

1. Look at the graphs below.



Which graph best describes the situation? Explain your reasoning.

2. What type of function is that? (Remember the 6 function types we studied in Unit 1?)
3. Let t = time in minutes. Let D = Bill's distance to Ted in meters. Using your calculator to help, which rule below best matches the situation?

$$D(t) = 4 \cdot |t - 20.83| \quad D(t) = 4 \cdot |t - 12.5| \quad D(t) = 240 \cdot |t - 20.83| \quad D(t) = 240 \cdot |t - 12.5|$$

4. Try to explain how the numbers in your rule (like the 12.5 or 20.83) relate to the situation and where they are seen in the graph.



During the run, Bill's tried to keep his heart rate around 160 beats per second. He says he would be happy if his heart rate was within 10 of his target heart rate.

5. What would be the minimum heart rate Bill would like to have? Maximum?
6. Try to describe in words all of the possible heart rates that Bill would consider as acceptable.
7. Using a number line, graph the "acceptable heart rates" for Ted.



8. Try to use symbols to describe Ted's acceptable heart rates.
 9. What is the value of $|160 - 150|$?
 10. What is the value of $|160 - 170|$?
 11. Let H = Ted's heart rate in beats per minute.
Which of the rules below do you think best describes Ted's "acceptable heart rates"?
- $|H - 160| \geq 10$ $|H - 160| \leq 10$ $|H - 10| \leq 160$ $|H - 10| \geq 160$



After the race, Bill and Ted went out to ice cream.
Ice cream is best served when it is between 6 and 10 degrees Fahrenheit.

12. Using words, number lines, symbols, absolute values, or whatever you can think of to describe the "best temperatures" for ice cream.