

Module 6 Lesson 4

Math Lab: Counting Beats **Possible Solutions**

Answers will vary. The following is a sample answer.

Part A: Data Collection

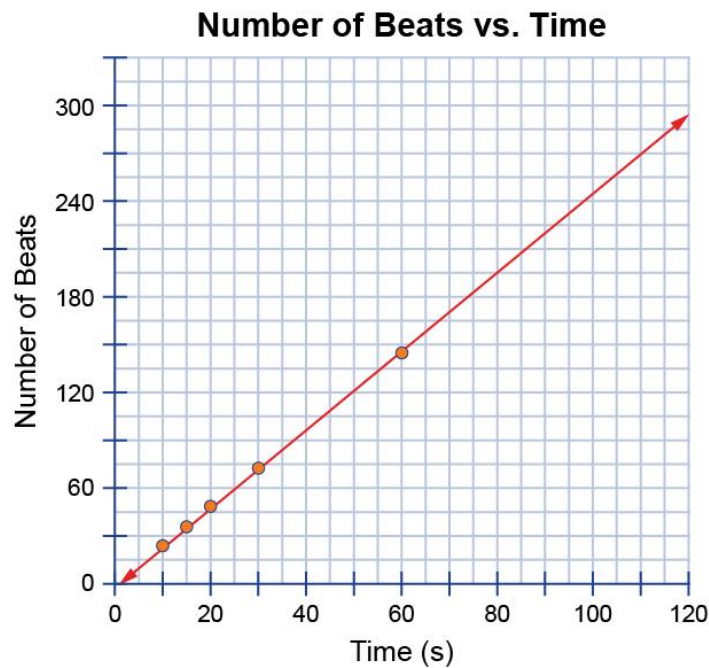
Step 1: Song selected is Kelly Clarkson's *My Life Would Suck Without You*.

Steps 2–4: The table is completed.

Time (s)	Number of Beats
10	24
15	36
20	49
30	73
60	146

Part B: Graph Data

Steps 5–6: The graph is drawn based on the data collected for Part A.



Analysis

The student is required to complete this section working with a partner.

1. One way to determine the BPM is to look at the number of beats after 60 seconds. For this song, the BPM is 146.
2. a. The slope of the line can be calculated by applying the slope formula to two points on the graph. Two such points are (25, 60) and (110, 270).

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{270 - 60}{110 - 25} \\ &= \frac{210}{85} \\ &\doteq 2.5 \end{aligned}$$

- b. This slope is 2.5 beats per second. At this rate, the beats per minute would be the following:

$$\frac{2.5 \text{ beats}}{\text{second}} \times \frac{60 \text{ seconds}}{\text{minute}} = 150 \text{ beats/minute}$$

- c. This is four more beats per minute than the actual count.
3. a. The y-intercept of the line is approximately (0, 0).
b. This represents the number of beats at the beginning of the counting period.
c. The y-intercept would remain about the same for all songs. It represents the number of beats in 0 seconds, so it would always be 0.
4. The equation of the line is $N = 2.5t$, where N is the number of beats and t is the time in seconds.
5. Answers may vary.
6. Answers may vary.
7. a. Answers may vary.
b.–c. If your partner's graph is steeper, then you can slow down that song or speed up the original song. If the partner's graph is less steep, then you can speed up that song or slow down the original song.
8. Answers may vary depending on the partner's results.
9. a. The y-intercept of the second line would be below the x-axis.
b. This number would represent the number of beats counted by the song in 45 seconds.