



# Line Graphs



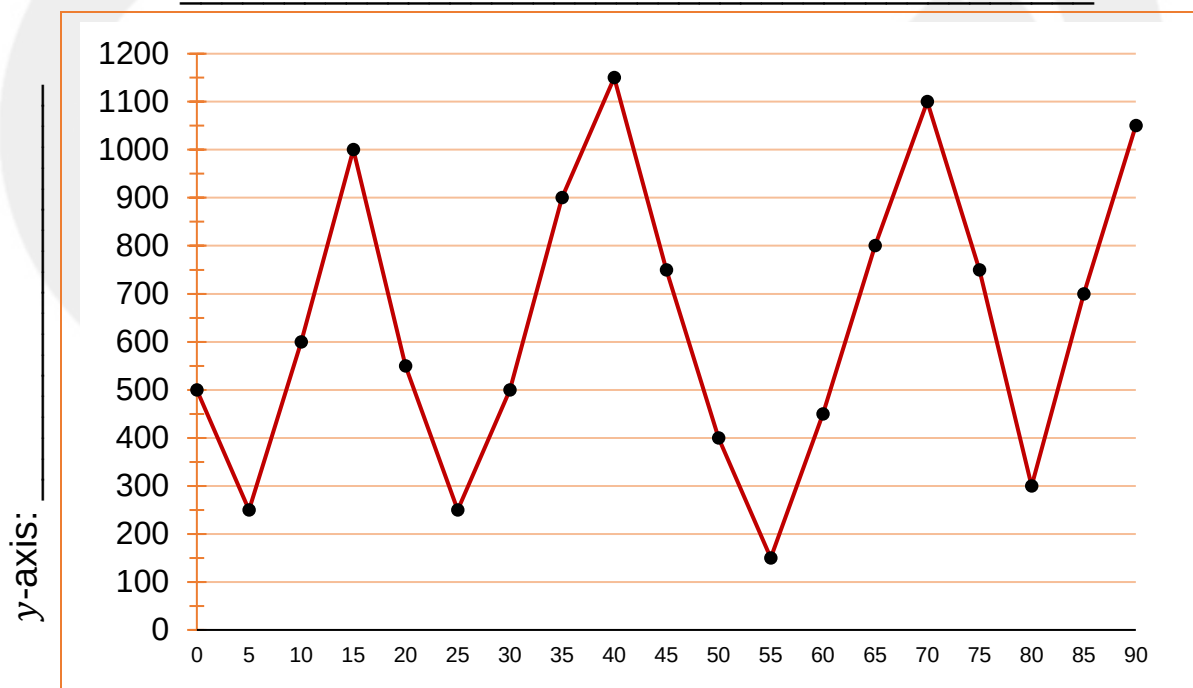
## The Marathon

Samantha is competing in an annual running marathon taking place in the streets around her neighbourhood. The line graph below shows Samantha's direct distance to her home as she is running. Samantha completes the marathon in 90 minutes.

In line graph below,

- Name the graph and the axes
- *Note: Black markers represent Samantha's distance from home (metres) as a function of time. Red graph lines represent her movement within five-minute intervals.*

Title: \_\_\_\_\_



$x$ -axis: \_\_\_\_\_



## Questions

- |                                                                                                                                               |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--|
| 1. How far away is the start point of the marathon from Samantha's house?                                                                     |  |
| 2. At the beginning of the race, is Samantha running towards her house or away from it?                                                       |  |
| 3. At which time point was Samantha closest to her house?                                                                                     |  |
| 4. What is the distance from home after 10 minutes?                                                                                           |  |
| 5. How far did Samantha run between $t = 35$ to $t = 45$ ?                                                                                    |  |
| 6. How far did Samantha run between $t = 60$ to $t = 80$ ?                                                                                    |  |
| 7. What is the direct distance between the start point and finish line?                                                                       |  |
| 8. If speed is measured as distance over time, what is Samantha's running speed (per min) from the start point to the first turn in the race? |  |
| 9. Find the difference in running speeds between the time intervals $t = 15$ to $t = 20$ and $t = 40$ to $t = 45$ .                           |  |



10. Find the intervals where Samantha ran the slowest.

11. Find the intervals where Samantha ran the fastest.

12. Acceleration is the change in velocity (speed) over time. Determine Samantha's acceleration between the time intervals  $t = 35$  to  $40$  and  $t = 40$  to  $45$ .

13. Assume that the last leg of the race is extended by 275 metres. Compared to Samantha's current interval speed in the last leg, by how much will she have to accelerate by in order to finish the race with the same time?