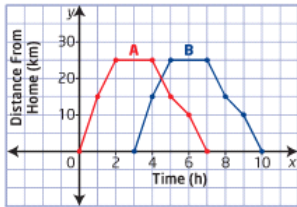


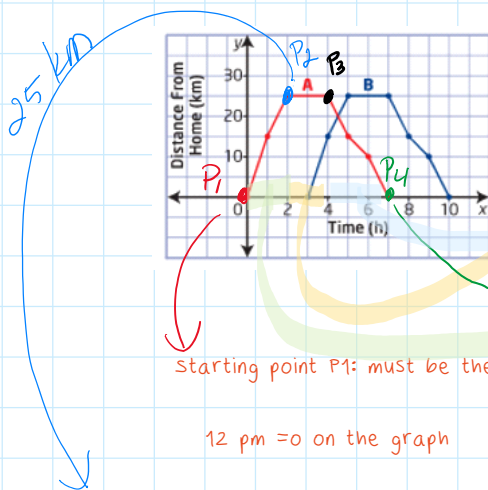
12. Janine is an avid cyclist. After cycling to a lake and back home, she graphs her distance versus time (graph A).

- a) If she left her house at 12 noon, briefly describe a possible scenario for Janine's trip.
- b) Describe the differences it would make to Janine's cycling trip if the graph of the function were translated, as shown in graph B.
- c) The equation for graph A could be written as  $y = f(x)$ . Write the equation for graph B.



a) graph A is in red

notice these points on the graph: P1, P2, P3, P4



the time highlighted has no change in km, it must be the stay at the lake. The duration is from 2 to 4, thus 2 hours.

It takes 3 hours (from 4 to 7) to go from P3 to P4.

P4: must be the return back home.

Starting point P1: must be the home

It takes 2 hours to go from point P1 to P2.

12 pm = 0 on the graph

this point P2 is an arrival, and there is no more km happening until the point P3, but time is passing in between.

The distance between P1 and P2 is the change in  $y = 25 - 0 = 25$

**In conclusion:** she bikes for two hours, 25m to the lake. She stays there for 2 hours, then bikes back home for 3 hours the 25 km back home.

b) We are looking at the blue graph. It was shifted Right by 3 units. This changes the start time of the activity, from 0 PM to 3 pm, i.e. later by 3 hours.

c) section b) already describes graph B as a transformation, i.e. a shift to the right by 3, and this is the only thing that is happening in graph B. All we need to do is translate this mathematically:

$$g(x) = f(x-3)$$