Two-Part Motions

Each of these problems has TWO distinct motions in it. Usually, one of them is uniform and the other is accelerated.

1) While out for a jog, Vivka is moving at 4.5 m/s. She runs with this speed for 15 minutes. Then she reaches a hill and as she moves up, Vivka slows down at a rate of 0.05 m/s² for 90 seconds, at which time she comes to a stop. What is the total distance she ran?

- 2) Princess Daisy turned her go-kart into the final straightaway on the race track. She drove 170 m down the road at constant speed of 22 m/s, then hit a super mushroom. The mushroom gave her a boost, accelerating her at a rate of 2.5 m/s² for the last 1.8 seconds until she reached the finish line and won first place!
 - A) What was the total time Daisy spent on the straightaway?
 - B) How long is the straightaway?
 - C) What is her average velocity <u>during her full time</u> on the straightaway?



3) You start a bicycle ride at the top of a hill. You coast down the hill with a constant acceleration of 2 m/s². When you reach the bottom, you're moving at 18 m/s, and you pedal to maintain that speed. If you continue at that speed for one minute, how far will you have gone from the time you left the hilltop?

Honors question:

- 4) When driving at 15 m/s, I noticed that the traffic light ahead was red. I took my foot off the gas to coast. The car slowed down at 2.3 m/s². When I had reached a speed of 4 m/s, the light changed back to green. I pressed the gas and accelerated back up to my original speed. The whole time from when I took my foot off the gas until I was back up to speed took 8.4 s.
 - A) What was my acceleration after the light turned green?
 - B) What total distance did I travel during the 8.4 seconds?