

GRAPHS OF MOTION (CONCEPTUAL QUESTIONS)

1. Sketch the displacement-time, velocity-time, and acceleration-time graphs for each of the following scenarios. (Be prepared to explain your sketches.)
 - a) An elevator that ascends from the lobby to the 36th floor, stops, descends to the 27th floor, stops, and returns to the lobby.
 - b) A basketball is dropped on the court and allowed to bounce up and down several times undisturbed.
 - c) A car on a test track performing a zero-to-sixty acceleration test. (This acceleration will not be uniform.)
 - d) A race between a tortoise and a hare that unfolds just like the fable of the same name. (An acceleration-time graph is not necessary for this particular problem.)
 - e) Two cars are adjacent to each other on a four-lane highway. The first car accelerates uniformly from rest the moment the light changes to green. The second car approaches the intersection already moving and is beside the first car at the instant the light changes. It then continues driving with a constant velocity.
 - f) Traffic lights on some streets are timed to facilitate traffic flow at a certain speed. Goofus and Gallant are stopped at a red light on this kind of street. When the light changes Goofus hammers the accelerator until he exceeds the speed limit. He arrives at the first light which is still red and stops. Gallant accelerates at a reasonable rate and never exceeds the speed limit. The second light turns green at just the right instant so that he never needs to brake at an intersection. Goofus and Gallant continue driving this way for three lights.