Key.

Physics 20

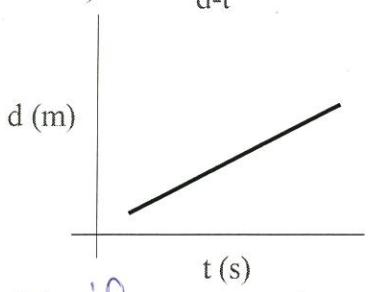
d-t & v-t Graph Worksheet

The following questions involve the interpretation of d-t (*aka position-time*) and v-t graphs. As you work through them, make sure that you keep in mind that different types of graphs show fundamentally different information. Besides reviewing Lesson 9, keep the following in mind:

d-t Graphs	**v-t Graphs**
Slope = velocity	Slope = acceleration
Area under line = no meaning	Area under line = displacement

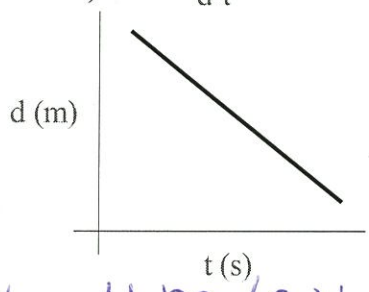
1. Each of the following d-t graphs shows the motion of a car on a street. **Describe** the motion of the car represented by each graph. Be specific!

a)



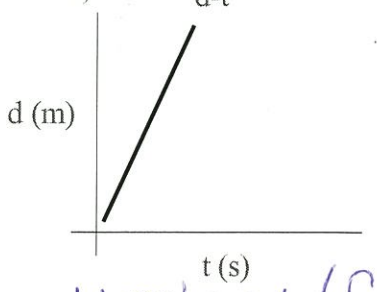
Uniform motion / Constant velocity (pos.)

b)



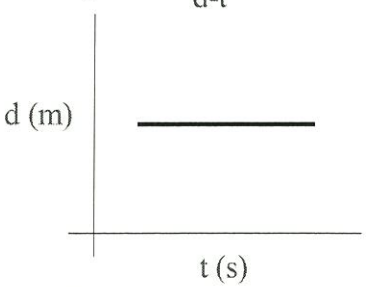
U.m/c.v. (neg.)

c)



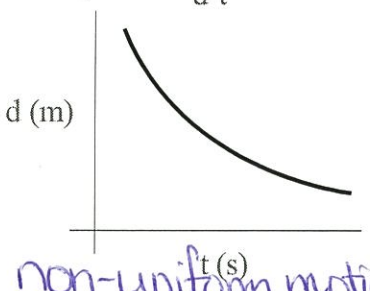
U.m/c.v (faster than (a))

d)



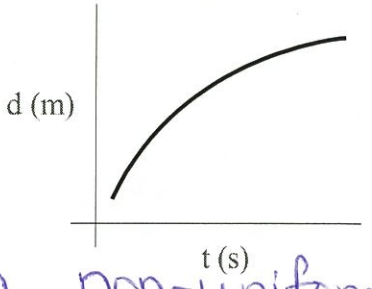
U.m/c.v at rest

e)



non-uniform motion acceleration (neg)

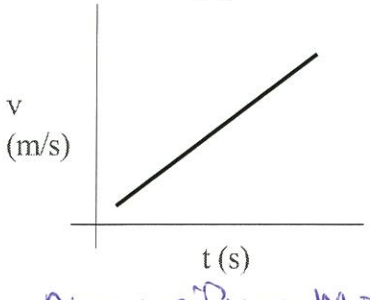
f)



non-uniform motion acceleration (~~pos.~~ neg.)

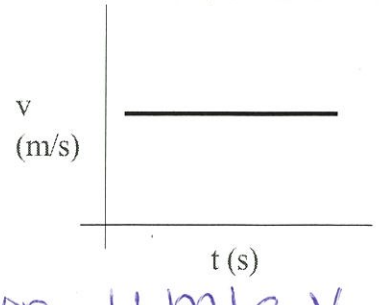
2. Each of the following v-t graphs shows the motion of a car on a street. **Describe** the motion of the car represented by each graph.

a)



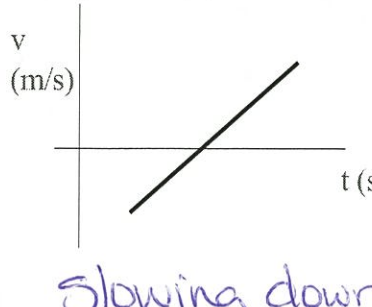
non-uniform motion positive acceleration

b)



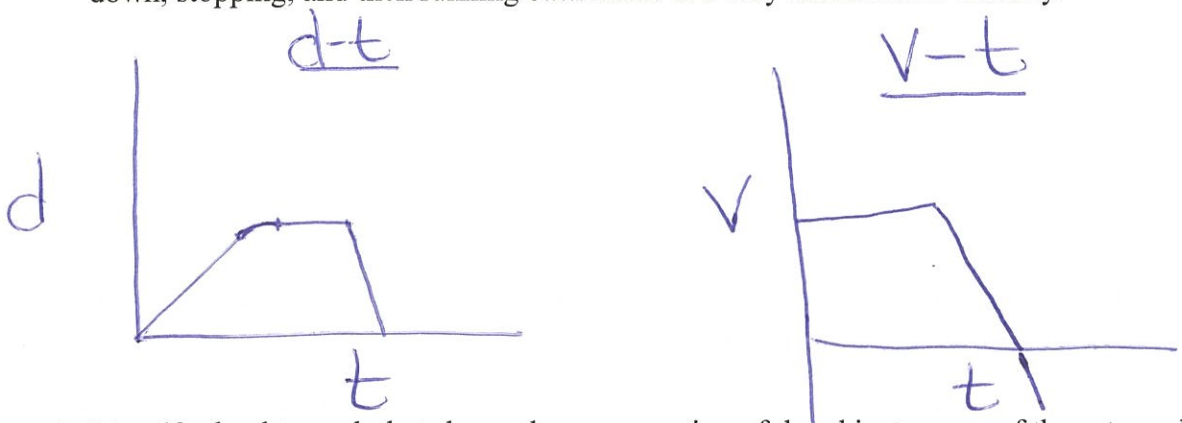
U.m/c.v positive

c)

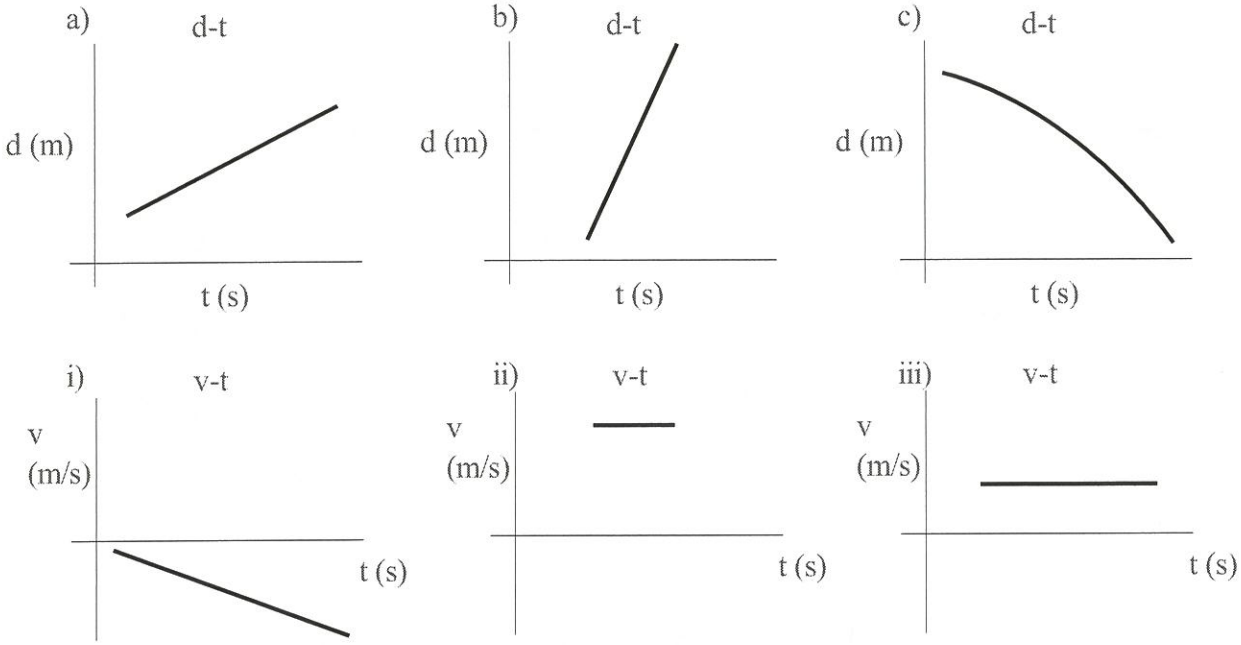


slowing down (neg. direction), stops, speeds up (other direction, non-uniform motion

3. **Sketch** a d-t and a v-t graph that show a bunny moving forwards at a constant velocity, slowing down, stopping, and then running backwards at a very fast uniform velocity.



4. **Identify** the d-t graph that shows the same motion of the object as one of the v-t graph.



a) iii
b) ii
c) i

5. The following graphs show information about a toy robot moving across the floor. Using concepts like slope and area under the line, **determine**:
   a) the velocity of the toy during the first part of the trip (solid line) from both graphs. $m = \frac{20_m}{10_s} = 2m/s$
   b) the total displacement of the toy. $\Delta w + bb = (10s)(2m/s) + \frac{(10s)(2m/s)}{2} = 20 + 10 = 30m$
   c) the acceleration of the toy during the end of the trip (dotted line). $m = \frac{-2m/s}{10s} = -0.2\ m/s^2$