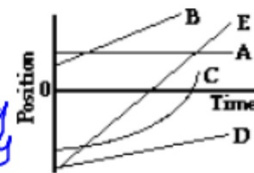


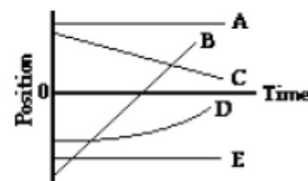
1. The slope of the line on a position vs. time graph reveals information about an object's velocity. The magnitude (numerical value) of the slope is equal to the object's speed and the direction of the slope (upward/+ or downward/-) is the same as the direction of the velocity vector. Apply this understanding to answer the following questions.

- a. A horizontal line means at rest; vel = 0 m/s
- b. A straight diagonal line means constant velocity
- c. A curved line means acceleration
- d. A gradually sloped line means slow constant velocity
- e. A steeply sloped line means fast constant velocity



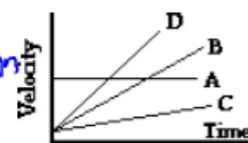
2. The motion of several objects is depicted on the position vs. time graph. Answer the following questions. Each question may have less than one, one, or more than one answer.

- A & E a. Which object(s) is(are) at rest?
- D b. Which object(s) is(are) accelerating?
- A & E c. Which object(s) is(are) not moving?
- None d. Which object(s) change(s) its direction?
- B e. Which object is traveling fastest?
- C f. Which moving object is traveling slowest?
- D g. Which object(s) is(are) moving in the same direction as object B?



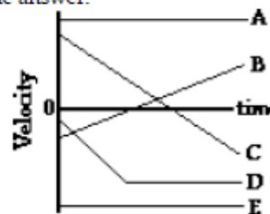
3. The slope of the line on a velocity vs. time graph reveals information about an object's acceleration. Furthermore, the area under the line is equal to the object's displacement. Apply this understanding to answer the following questions.

- a. A horizontal line means constant velocity
- b. A straight diagonal line means constant acceleration
- c. A gradually sloped line means slow const. accel.
- d. A steeply sloped line means fast const. accel.



4. The motion of several objects is depicted by a velocity vs. time graph. Answer the following questions. Each question may have less than one, one, or more than one answer.

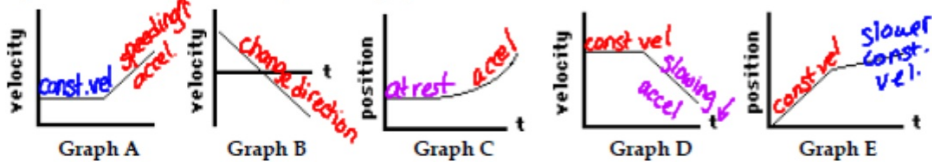
- a. Which object(s) is(are) at rest? None
- b. Which object(s) is(are) accelerating? B & C
- c. Which object(s) is(are) not moving? None
- d. Which object(s) change(s) its direction? B & C
- e. Which accelerating object has the smallest acceleration? B
- f. Which object has the greatest acceleration? C
- g. Which object(s) is(are) moving in the same direction as object E? D



5. The graphs below depict the motion of several different objects. Note that the graphs include both position vs. time and velocity vs. time graphs.



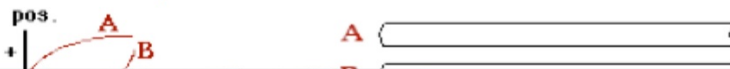
5. The graphs below depict the motion of several different objects. Note that the graphs include both position vs. time and velocity vs. time graphs.



The motion of these objects could also be described using words. Analyze the graphs and match them with the verbal descriptions given below by filling in the blanks.

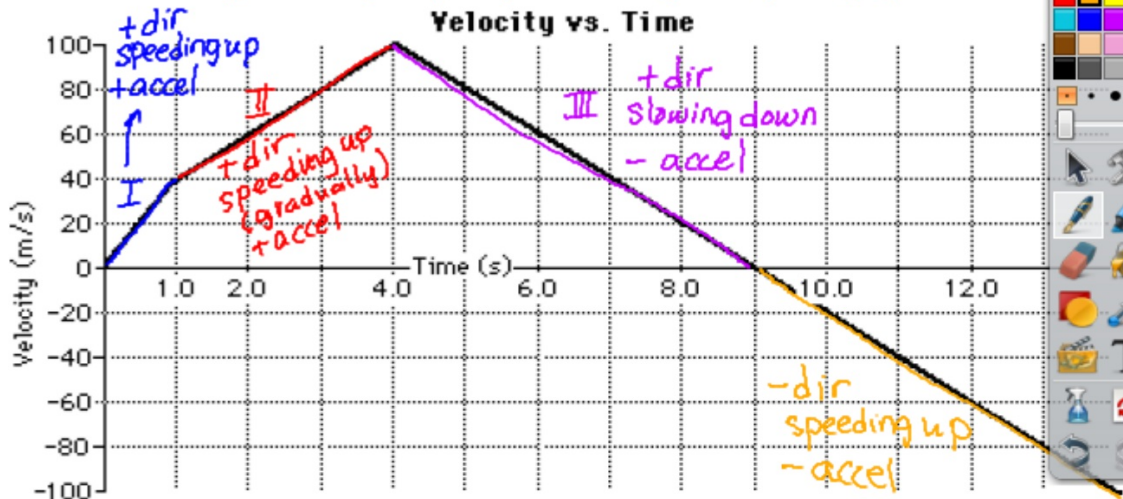
Verbal Description	Graph
a. The object is moving fast with a constant velocity and then moves slow with a constant velocity.	E
b. The object is moving in one direction with a constant rate of acceleration (slowing down), changes directions, and continues in the opposite direction with a constant rate of acceleration (speeding up).	B
c. The object moves with a constant velocity and then slows down.	D
d. The object moves with a constant velocity and then speeds up.	A
e. The object maintains a rest position for several seconds and then accelerates.	C

6. Consider the position-time graphs for objects A, B, C and D. On the *ticker tapes* to the right of the graphs, construct a dot diagram for each object. Since the objects could be moving right or left, put an arrow on each *ticker tape* to indicate the direction of motion.



### Interpreting Velocity-Time Graphs

The motion of a two-stage rocket is portrayed by the following velocity-time graph.



Several students analyze the graph and make the following statements. Indicate whether the statements are correct or incorrect. Justify your answers by referring to specific features about the graph.

Student Statement

Correct?  
Yes or No

etch p-t and v-t graphs that represent the situation

Interpreting Velocity-Time Graphs.pdf - Adobe Reader

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Several students analyze the graph and make the following statements. Indicate whether the statements are correct or incorrect. Justify your answers by referring to specific features about the graph.

Student Statement	Correct? Yes or No
1. After 4 seconds, the rocket is moving in the negative direction (i.e., down). Justification: <u>The rocket is still moving in the positive direction because the line is above the x-axis.</u>	<u>No</u>
2. The rocket is traveling with a greater speed during the time interval from 0 to 1 second than the time interval from 1 to 4 seconds. Justification: <u>From 0-1s the speed increases from 0 to 40 m/s, but from 1-4 s from 40 to 100 m/s</u>	<u>No</u>
3. The rocket changes its direction after the fourth second. Justification: <u>The rocket is still moving in the positive direction because the line is above the x-axis.</u>	<u>No</u>
4. During the time interval from 4 to 9 seconds, the rocket is moving in the positive direction (up) and slowing down. Justification: <u>The line is above the x-axis and the velocity values are decreasing from 100 to 0 m/s</u>	<u>Yes</u>
5. At nine seconds, the rocket has returned to its initial starting position. Justification: <u>At 9 s, the rocket returns to its initial velocity 0 m/s. The rocket changes direction (starts falling)</u>	<u>No</u>

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