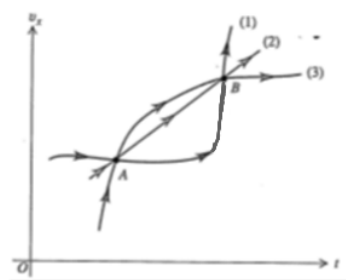


For questions 3 through 4 circle all correct answers, a given problem may have more than one correct answer. Each correctly circled answer will receive two points. There are 7 correct answers in this section and only the first 7 circled answers will be graded. There is no partial credit.



3. The velocity of three different objects moving in a straight line are plotted to the right. Which of the following statements about their motion are *necessarily* (must be) true?

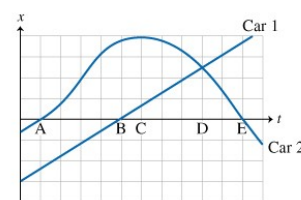
- [F] (a) At point A, the velocity of object 3 is greater than object 1 or 2.
- [T] (b) At point A, the acceleration of object 3 is greater than object 1 or 2.
- [?] (c) At point A, the position of object 3 is the same as object 1 or 2.

- [F] (d) At point B, the velocity of object 2 is greater than object 3.
- [T] (e) At point B, the acceleration of object 2 is greater than object 3.
- [?] (f) At point B, the position of object 2 is greater than object 3.

- [F] (g) Object 2 travels the same distance as object 1 between points A and B.
- [T] (h) Object 2 travels a greater distance than object 1 between points A and B.
- [T] (i) Object 2 has the same average acceleration as object 3 between points A and B.
- [F] (j) Object 2 has a greater average acceleration than object 3 between points A and B.

4. Two cars positions as a function of time are plotted to the right. Which of the following statements are false regarding this situation?

- [F] (a) Car 1 has the greatest average velocity between points A and D.
- [T] (b) Car 2 has the greatest average velocity between points A and D.
- [F] (c) Car 2 has the same acceleration at point B as car 1 does at point E.
- [T] (d) Car 2 has the greatest acceleration at point C.
- [F] (e) Car 1 is momentarily at rest at point B.
- [T] (f) Car 2 is momentarily at rest at point C.



5. (2 points) Einstein's famous equation $E = mc^2$, relates energy (E), to mass (m) and the speed of light (c). What are (a) the dimensions, and (b) SI fundamental units of energy?

6. (10 points) Deserted on a deserted Island you spot a slightly exposed tin can under a tree. Upon opening it you find it's instructions to a treasure. It reads: "*Ten paces from this very tree in a direction twenty degrees south of west lies the first location. Ten paces from this very tree in a direction sixty degrees north of east lies the second location. Walk from this tree exactly the distance and direction you would walk from the first location to the second location and you will find ye treasure. Yar*" What are the coordinates of treasure?

7. (15 points) While on a 80.0-m-high bridge you see a raft floating at a constant speed on the river below. Trying to hit the raft, you drop a rock from rest when the raft has 7.00 m more to travel before passing under the bridge. The rock hits the water 4.00 m in front of the raft. (a) How long did it take for the rock to reach the water? (b) What is the speed of the raft. (c) What speed would you have needed to throw the rock straight upward if it is to hit the raft?

Scores:

Problems

1	2	3-5	6	7	8
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Exam Total