Physics 2204
Assignment 2
Adding Vectors and graphical Analysis

Name:_____

Multiple Choice: Show all workings for questions that involve calculations.

1. What is the opposite of the following vector: 20 km [N 30° E]?
   A) 20 km [E 30º N]
   B) 20 km [E 60° N]
   C) 20 km [S 30º W]
   D) 20 km [S 60° W]

2. Which of the following vectors is the same as 26 m/s [W 78°S]?
   A) 26 m/s [E 78º N]
   B) 26 m/s [S 78º W]
   C) 26 m/s [S 12º W]
   D) 26 m/s [W 12º S]

3. John walks 9 km East and 12 km South. What is his displacement?
   A) 15 km [37º SE]
   B) 15 km [53° SE]
   C) 15 km [E 37° S]
   D) 15 km [S 53° E]

4. A slug traveling through a cabbage patch travels 7.0 cm [E], 5.0 cm [W], then 2.0 cm [S]. How far and in what direction did it end up with reference to its original position?
   A) 2.8 cm [E 45º N]
   B) 2.8 cm [N 45º W]
   C) 2.8 cm [S 45 º E]
   D) 2.8 cm [S 45 º W]

5. What does the slope of a position-time graph represent?
   A) displacement
   B) distance
   C) velocity
   D) change in velocity

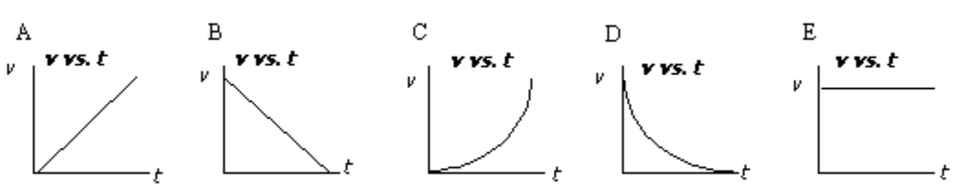
6. What does the slope of a velocity-time graph represent?
   A) displacement
   B) distance
   C) change in velocity
   D) acceleration

7. What does the area under a velocity-time graph represent?
   A) displacement
   B) change in velocity
   C) distance
   D) acceleration

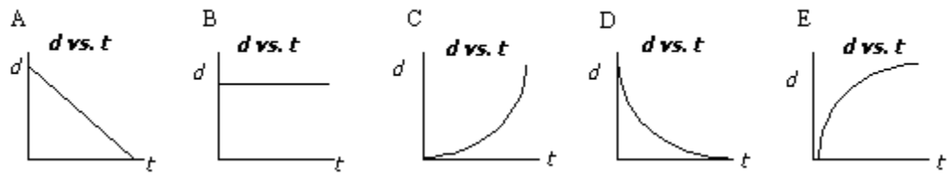
8. What does the slope of a line drawn tangent to a curved position-time graph represent?
   A) displacement
   B) instantaneous velocity
   C) average velocity
   D) acceleration

9. An object is travelling north and slowing down. What are the directions associated with the object's velocity and acceleration, respectively?
   A) [N], [N]
   B) [N], [S]
   C) [S], [N]
   D) [S], [S]

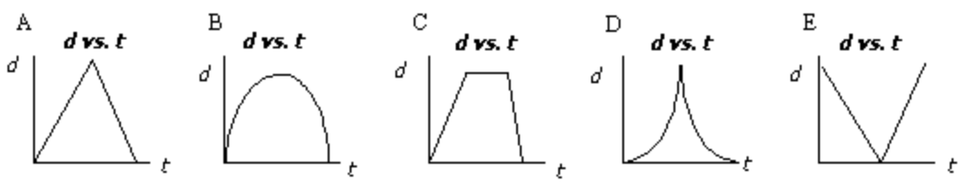
10. Which velocity-time graph that represents "uniform motion"?



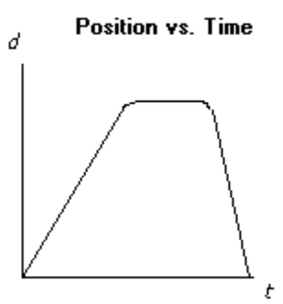
11. Which position-time graph that represents "uniform motion"?



12. Which position-time graph depicts a ball thrown vertically upward that returns to the same position?

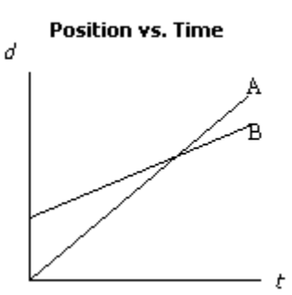


13. Study the position-time graph pictured below and select the statement that is true.



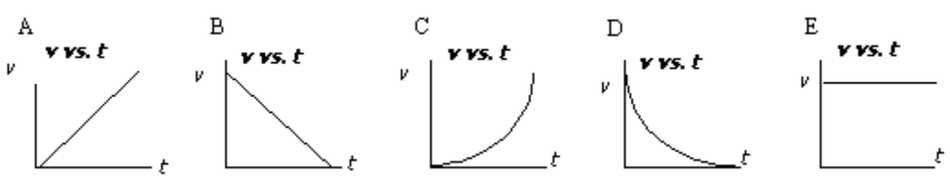
A) The object accelerates, stops, then accelerates in the opposite direction.
B) The object's speed is greatest during the first segment.
C) The object's acceleration is greatest during the last segment.
D) The object's average velocity is zero.

14. The position-time graph pictured below represents the motions of two objects, A and B. Which of the following statements concerning the objects' motions is true?

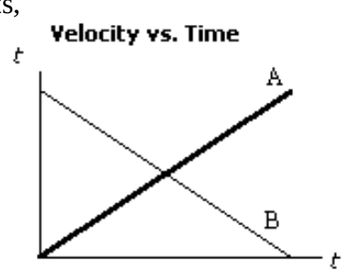


A) Object B travels the greater distance.
B) Object A has the greater speed.
C) Object A leaves the reference point at an earlier time.
D) Both objects have the same speed at the point where the lines cross.

15. Which of the following velocity-time graphs represents the motion of a ball thrown vertically upward?



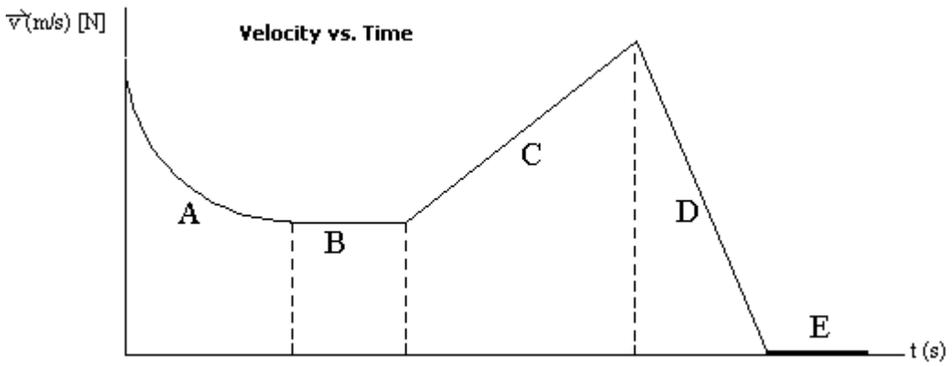
16. The following velocity-time graph depicts the motions of two objects, A and B. Which of the statements describing the graph is true?



A) Both objects are accelerating uniformly.
B) The two objects are travelling in opposite directions.
C) Both objects start from rest.
D) Object A travels farther than object B.

Matching

Study the velocity-time graph pictured below and match each segment of the graph with the description of its motion at that time.



A) segment A
B) segment B
C) segment C
D) segment D
E) segment E

____ 17. The object is motionless during this segment.

____ 18. The object is moving with constant velocity during this segment.

____ 19. The object travels the greatest distance during this segment.

____ 20. The object is experiencing non-uniform acceleration during this segment.

____ 21. The object is travelling north but accelerating south at a constant rate during this segment.

Match the item with the correct statement below.

A) Acceleration B) Average Velocity C) Displacement

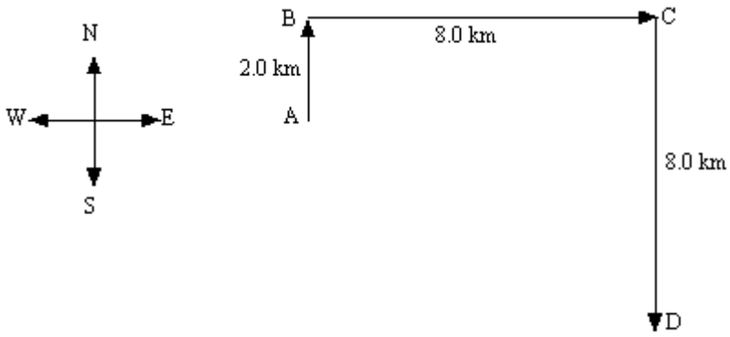
____ 22. Found by taking the slope of a position-time graph.

____ 23. Found by taking the slope of a velocity-time graph.

____ 24. Found by taking the area under a velocity-time graph.

25. An explorer walks 13 km due [E] then 18 km [N] and finally 3 km [W]. What is the resultant displacement of the explorer from the starting point? Use a scale diagram.

26. A group of hikers sets out from point A, proceeds to B, then to C, and finally to D. The entire trip takes 6.0 h.



(a) Find the hikers total distance and total displacement.

(b) Determine the hikers' average speed and average velocity for the trip.

18. A taxi cab drives 4.7 km [W], then 9.6 km [N], then 4.4 km [W], and finally 18.9 km [S]. The entire trip takes 0.75h. What is the taxi's average velocity? (Use Pythagorean Theorem and Trigonometry to find displacement first.)