Kinematics Chapter Questions

1. When you drive a car and take a quick look on the speedometer, what do you see velocity or speed?

2. A ball is thrown vertically up and is caught at the starting point; compare the traveled distance and displacement of the ball.

3. Can an object with a constant acceleration reverse it direction of travel? Explain.

4. Can an object have a varying velocity when its speed is constant? Explain.

5. Is it possible for an object to have average velocity equal to its instantaneous velocity?

6. What quantity describes how quickly you change your speed?

7. Can an object have a southward velocity and a northward acceleration?

8. Is it possible for an object to have average speed equal to the magnitude of its average velocity?

9. If the speedometer of a car reads constant speed 50 mi/h, does it mean that the car has constant velocity?

10. What does the area under the curve on a velocity-versus-time graph represent?

11. What does the slope of the curve on a displacement-versus-time graph represent?

12. What does the slope of the curve on a velocity-versus-time-time graph represent?

Chapter Problems

Motion at Constant Speed

Class Work

1. A rabbit can cover a distance of 80 m in 5 s. What is the speed of the rabbit?

2. During the first 50 s a truck traveled at constant speed of 25 m/s. Find the distance that it traveled.

3. An elevator ascends at a constant speed of 4 m/s, how much time is required for the elevator in order to travel 120 m upwards?

4. A racing car can complete a 900 m long lap in 15 s. What is the speed of the car?

5. It is known that a shark can travel at a speed of 15 m/s. How far can a shark go in 10 seconds?

6. How long does it take an airplane to fly 1500 miles if it maintains a speed of 600 miles per hour?

7. A person can run 280 m in 68 s. At what speed are they running?

8. How far does a runner travel if they maintain a speed of 8.5 m/s for 240 s?

Homework

9. A sportsman can develop a maximum speed of 12 m/s when he is swimming in a pool. Calculate the time interval that is required to travel a distance of 25 m.

10. A polar bear walks a distance of 160 meters in 60 seconds. What was its speed?

11. A train travels 120 seconds at a speed of 50 m/s. How far did it go?

12. How long will it take a runner to travel a distance of 1000 m at a speed of 12 m/s?

13. A car travels a distance of 1600 km in 24 hours. What was its speed?

14. A sailboat travels a distance of 600 m in 40 seconds. What speed is it going?

15. What distance will a car traveling at a speed of 50 km/hr cover in 0.25 hr?

16. How long will it take a ball to roll 10 meters along the floor at a speed of 0.5 m/s?

Non-Uniform Motion and Average Speed

Class Work

17. A boat travels 40 miles in two hours, speeds up to travel the next 80 miles in three hours then slows down to travel the last 40 miles in three hours. What is the average speed of the boat for the entire trip?

18. A car travels for an hour at a speed of 20 km/r, the next two hours at a speed of 65 km/r and the final hour at a speed of 85 km/r. What is the average speed of the car for the entire trip?

19. A bicyclist travels the first 800 m of a trip with a speed of 10 m/s, the next 500 m with an average speed of 5 m/s and the final 1200 m at a speed of 13 m/s. Find the average speed of the bicyclist for this trip.

20. A bicyclist travels the first 700 m of a trip at an average speed of 8 m/s, travels the next 600 m in 90 s and the last 50s at a speed of 21 m/s. Find the average speed of the bicyclist for this trip.

21. A car travels 100 km in the first two hours, stops for half an hour and then travels 200 km in the next four hours. Find the average speed of the car.

22. An airplane travels at a speed of 300 km/h for 2 hours, speeds up to 400 km/h for the next hour and then travels the final four hours at a speed of 500 km/h. What is the average speed of the plane for this trip?

Homework

23. An airplane travels 2800 km at a speed of 700 km/h, decreases its speed to 500 km/h for the next 1500 km and travels the last 1000 km at a speed of 400 km/h. Find the average speed of the plane for the trip.

24. An airplane travels 2100 km at a speed of 500 km/h, encounters a head wind that decreases its speed to 400 km/h for the next three hours and then travels the last 400 km to complete the trip at an average speed, for the entire trip of 440 km/h. What was the speed of the plane for the last part of the trip?

25. A runner runs the first 400m of a race in 80s, the second 400m in 70s and the final 800m in 130s. What was her average speed for this run?

26. A train travels from Boston to New York. It travels at a speed of 180 km/h for two hours, speeds up to 200 km/h for the next four hours and then slows down to 120 km/h for the next six hours. What is the average speed of the train for this trip?

27. A train travels 120 km at a speed of 60 km/h, makes a stop for 0.5 h, and then travels the next 180 km at a speed of 90 km/h. What is the average speed of the train for this trip?

28. A train travels a total distance of 600km in eight hours. It travels the first 120 km at a speed of 60 km/h, travels the next 180 km in two hours and then completes the trip at an unknown speed. What was the average speed of the train for the last leg of the trip? What is the average speed of the train for the entire trip?

Position, Displacement and Velocity
Class Work

29. An object moves from the position +16 m to the position +47 m in 12 s. What is its total displacement? What is its average velocity?

30. A balloon drifts 140 m toward the west in 45 s; then the wind suddenly changes and the balloon flies 90 m toward the east in the next 25 s.
    a. What distance did it travel during the first 45 s?
    b. What distance did it travel during the next 25 s?
    c. What total distance did it travel?

    d. What was its average speed during the first 45 s?
    e. What was its average speed during the next 25 s?
    f. What was its average speed for the entire trip?

    g. What was its displacement during the first 45 s?
    h. What was its displacement during the next 25 s?
    i. What was its total displacement?

    j. What was its average velocity during the first 45 s?
    k. What was its average velocity during the next 25 s?
    l. What was its average velocity for the entire trip?

Homework

31. An object moves from the position +34 m to the position -15 m in 15 s. What is its total displacement? What is its average velocity?

32. A balloon drifts 30 m toward the east in 10 s; then the wind suddenly changes and the balloon flies 50 m toward the west in the next 5 s.
    a. What distance did it travel during the first 10 s?
    b. What distance did it travel during the next 5 s?
    c. What total distance did it travel?

    d. What was its average speed during the first 10 s?
    e. What was its average speed during the next 5 s?
    f. What was its average speed for the entire trip?
    g. What was its displacement during the first 10 s?
    h. What was its displacement during the next 5 s?
    i. What was its total displacement?

    j. What was its average velocity during the first 10 s?
    k. What was its average velocity during the next 5 s?
    l. What was its average velocity for the entire trip?

33. An object moves from the position -12 m to the position +17 m in 9 s. What is its total displacement? What is its average velocity?

34. An object starts at a point +25 m goes 40 m toward +X direction in 5 s then suddenly changes its direction to the opposite and covers 50 m in 10 seconds.
    a. Where is the object after the first 5 s?
    b. Where is the object after the next 10 s?
    c. What total distance did it travel?

    d. What was its average speed during the first 5 s?
    e. What was its average speed during the next 10 s?
    f. What was its average speed for the entire trip?

    g. What was its displacement during the first 5 s?
    h. What was its displacement during the next 10 s?
    i. What was its total displacement?

    j. What was its average velocity during the first 5 s?
    k. What was its average velocity during the next 10 s?
    l. What was its average velocity for the entire trip?

Problem Solving with Kinematics Equation 1
Class Work

35. If an object accelerates from rest, with a constant acceleration of 5.4 m/s^2, what will its velocity be after 28s?

36. An object is traveling at a constant velocity of 15 m/s when it experiences a constant acceleration of 3.5 m/s^2 for a time of 11 s. What will its velocity be after that acceleration?

37. An object is moving at a velocity of 23 m/s. It accelerates to a velocity of 85 m/s over a time of 8.3 s. What acceleration did it experience?

38. An object initially at rest experiences an acceleration of 9.8 m/s^2. How much time will it take it to achieve a velocity of 58 m/s?

39. An object accelerates to a velocity of 34 m/s over a time of 1.3 s. The acceleration it experienced was 15 m/s^2. What was its initial velocity?

40. If an object accelerates from rest, what will its velocity be after 2.1 s if it has a constant acceleration of 9.8 m/s^2?

41. A car is driving at a velocity of 24 m/s. If its brakes can supply an acceleration of -5.0 m/s^2, how much time will be required to bring the car to a stop?

Homework

42. A car's speedometer reads 20 m/s after accelerating, from a standing start, for 25s. What was the magnitude of its acceleration?

43. A train departs from its station at a constant acceleration of 5 m/s^2. What is the speed of the train at the end of 20s?

44. An object accelerates to a velocity of 230 m/s over a time of 2.5 s. The acceleration it experienced was 42 m/s^2. What was its initial velocity?

45. If an object accelerates from rest, what will its velocity be after 12.3 s if it has a constant acceleration of 4.6 m/s^2?

46. An object increases its velocity from 22 m/s to 36 m/s in 5 s. What is the acceleration of the object?

47. A bicyclist is traveling at a speed of 5 m/s when it suddenly accelerates, at a constant rate of 0.6 m/s^2, for a time of 10s. What is the speed of the bicycle at the end of that 10s?

48. An object, initially traveling at a velocity of 52 m/s, experiences an acceleration of -9.8 m/s^2. How much time will it take it to come to rest?

49. An object accelerates at a rate of -3.2 m/s to a velocity of 5 m/s over a time of 10 s. What was its initial velocity?

Problem Solving with g= 9.8 m/s^2

Class Work

50. What is the velocity of a dropped object after it has fallen for 3.0s?

51. A ball is thrown straight up with a velocity of 16 m/s; what will be its velocity 2.0s after being released?

52. A stone is thrown down off a bridge with a velocity of 5.6 m/s. What is its velocity after 3 seconds have passed?

53. A ball is thrown straight up from the ground with an unknown velocity. It reaches its highest point after 3.5 s. With what velocity did it leave the ground?

54. An arrow is launched straight up with a velocity of 12.6 m/s. How long before the arrow returned to the ground?

Homework

55. What is the velocity of a dropped object after it has fallen for 12 s?

56. A ball is thrown straight down with a velocity of 12 m/s; what will be its velocity 2.0 s after being released?
57. A ball is thrown straight up with a velocity of 12 m/s; what will be its velocity 2.0 s after being released?

58. An arrow is launched straight up from the ground with an initial velocity of 23.4 m/s. How long until it reaches its highest point?

59. A ball is thrown straight up from the ground with an unknown velocity. It returns to the ground after 4.0 s. With what velocity did it leave the ground?

Problem Solving with Kinematics Equation 2
Class Work

60. An object accelerates from rest with a constant acceleration of 2 m/s^2. How far will it have moved after 9s?

61. An object, moving with a constant velocity, travels 274 m in 23 s. What is its velocity?

62. An object, moving with constant acceleration and zero initial velocity, travels 48 m in 5.2 s. What is the magnitude of its acceleration?

63. An object, initially at rest, is subject to an acceleration of 34 m/s^2. How long will it take for that object to travel 3400 m?

64. An object is shot upwards, from the ground, with an initial velocity of 120 m/s. How high will it be after 4.0s?

65. An object is traveling with a constant velocity of 5 m/s. How far will it have gone after 7 s?

66. You are 12 miles north of your base camp when you begin walking north at a speed of 2 miles per hour. What is your location, relative to your base camp, after walking for 5 hours?

67. An object, initially at rest, moves 250 m in 17 s. What is its acceleration?

68. An object is shot upwards, from the ground, with an initial velocity of 40 m/s. How high will it be after 2.0s?

69. An object is dropped from a 42 m tall building. How long does it take to reach the ground?

Homework

70. An object is moving with an initial velocity of 23 m/s. It is then subject to a constant acceleration of 3.5 m/s^2 for 12 s. How far will it have traveled during the time of its acceleration?

71. An object is moving with a constant velocity of 278 m/s. How long will it take it to travel 7500 m?

72. An object travels at a constant velocity of 15 m/s for 5.0 seconds. How far does it move during that time?

73. How long will it take a person walking at 2.1 m/s to travel 13 m?

74. You are at a rest stop 250 miles north of New York City. You then travel north at a constant velocity of 65 miles per hour for 2.0 hours. Describe your location relative to New York City.

75. An object is at rest when it undergoes a constant acceleration of 13 m/s^2 for 5.0 seconds. How far will it have traveled during this time?

76. An object is dropped from the top of a building and strikes the ground 2.0s later. How tall is the building?

Problem Solving with Kinematics Equation 3
Class Work

77. An object accelerates from rest with a constant acceleration of 7.5 m/s^2. How fast will it be traveling after it goes 21 m?

78. An object experiences an acceleration of 9.8 m/s^2 over a distance of 210 m. After that acceleration it has a velocity of 380 m/s. What was its velocity before being accelerated?

79. An object accelerates from rest to a speed of 24 m/s over a distance of 56 m. What acceleration did it experience?

80. An object experiences an acceleration of 6.8 m/s^2. As a result, it accelerates from rest to 24 m/s. How much distance did it travel during that acceleration?

81. A car which is traveling at a velocity of 15 m/s undergoes an acceleration of 6.5 m/s^2 over a distance of 340 m. How fast is it going after that acceleration?

82. A car slams on its brakes creating an acceleration of -3.2 m/s^2. It comes to rest after traveling a distance of 210 m. What was its velocity before it began to accelerate?

Homework

83. An object accelerates from rest to 85 m/s over a distance of 36 m. What acceleration did it experience?

84. An object experiences an acceleration of -6.8 m/s^2. As a result, it accelerates from 54 m/s to a complete stop. How much distance did it travel during that acceleration?

85. An object is dropped from a 32 m tall building. How fast will it be going when it strikes the ground?

86. An object is dropped from a building and strikes the ground with a speed of 31m/s. How tall is the building?

87. A hopper jumps straight up to a height of 1.3 m. With what velocity did it leave the floor?

88. A hopper jumps straight up to a height of 0.45 m. With what velocity will it return to the table?

Problem Solving with All Three Kinematics Equations
Examples

89. An object is moving with an initial velocity of 19 m/s. It is then subject to a constant acceleration of 2.5 m/s^2 for 15 s. How far will it have traveled during the time of its acceleration?

90. An object accelerates from rest, with a constant acceleration of 8.4 m/s^2, what will its velocity be after 11s?

91. An arrow is projected by a bow vertically up with a velocity of 40 m/s, and reaches a target in 3 s. What is the velocity of the arrow just before it hits the target? How high is the target located?

92. An object is traveling with a constant velocity of 3.0 m/s. How far will it have gone after 4.0 s?

93. An object accelerates from rest to a velocity of 34 m/s over a distance of 70 m. What was its acceleration?

94. An object falls from a height of 490 m. How much time does it take for the object to reach the ground?

Class Work

95. A car which is traveling at a velocity of 1.6 m/s undergoes an acceleration of 9.2 m/s^2 over a distance of 540 m. How fast is it going after that acceleration?

96. An object is traveling at a constant velocity of 25 m/s when it experiences a constant acceleration of 1.5 m/s^2 for a time of 38 s. What will its velocity be after that acceleration?

97. A water drop falls down from the roof of a house during 3 s, how high is the house?

98. An object accelerates from rest with a constant acceleration of 7.5 m/s^2. How fast will it be traveling after it goes 87 m?

99. An object is moving at a velocity of 8.8 m/s. It accelerates to a velocity of 35 m/s over a time of 6.3 s. What acceleration did it experience?

100. A ball is thrown vertically down from the edge of a cliff with a speed of 8 m/s, how high is the cliff, if it took 6 s for the ball to reach the ground?

101. What is the landing velocity of an object that is dropped from a height of 49 m?

102. An object accelerates from rest, with a constant acceleration of 7.4 m/s^2, what will its velocity be after 5.4 s?
103. An object is traveling with a constant velocity of 2.0 m/s. How far will it have gone after 38 s?

Homework

104. An object accelerates from rest to a velocity of 22 m/s over a distance of 35 m. What was its acceleration?

105. An object is dropped from a height of 100 m, how long is it in the air?

106. An object is moving with an initial velocity of 5.5 m/s. It is then subject to a constant acceleration of 2.5 m/s^2 for 11 s. How far will it have traveled during the time of its acceleration?

107. A pump can throw a stream of water up to 29.6 m. What is the initial speed of the stream when it leaves a hose nozzle?

108. A stone is dropped from the roof of a building. It took 5 s for the stone to reach the ground. What is the height of the building?

109. What is the landing velocity of an object that is thrown vertically down with a velocity of 5 m/s from a height of 25 m?

110. An object accelerates from rest with a constant acceleration of 7.5 m/s^2. How fast will it be traveling after it goes 12 m?

111. An object is traveling at a constant velocity of 11 m/s when it experiences a constant acceleration of 1.5 m/s^2 for a time of 14 s. What will its velocity be after that acceleration?

112. An object is thrown vertically up with a velocity of 35 m/s. What was the maximum height it reached?

113. A boy throws a ball vertically up and catches it after 3 s. What height did the ball reach?

114. An object is moving at a velocity of 5.8 m/s. It accelerates to a velocity of 25 m/s over a time of 3.3 s. What acceleration did it experience?

115. A car which is traveling at a velocity of 9.6 m/s undergoes an acceleration of 4.2 m/s^2 over a distance of 450 m. How fast is it going after that acceleration?

116. A marble is projected vertically up by a spring gun, and reaches the maximum height of 9.8 m. What is the initial speed of the marble? How long did it take the marble to reach maximum height?

117. An arrow is shot vertically up by a bow, and after 8 s returns to the ground level. What is the initial velocity of the arrow? How high did it go?

Creating Graphs
Examples

118. Starting at the position, x_0 = 4 m, you travel at a constant velocity of +2 m/s for 6s.
    a. Determine your position at the times of 0s; 2s; 5s; and 6s.
    b. Draw the Position versus Time for your travel during this time.
    c. Draw the Velocity versus Time graph for your trip.

119. Starting at the position, x_0 = -15 m, you travel at a velocity of +5 m/s for 3s.
    a. Determine your position at the times of 0s; 1s; 2s; and 3s.
    b. Draw the Position versus Time for your travel during this time.
    c. Draw the Velocity versus Time graph for your trip.

Class Work

120. Starting at the position, x_0 = 12 m, you travel at a velocity of +10 m/s for 5 s.
    a. Determine your position at the times of 0s; 1s; 4s; and 5s.
    b. Draw the Position versus Time for your travel during this time.
    c. Draw the Velocity versus Time graph for your trip.

121. Starting at the position, x_0 = -25 m, you travel at a velocity of -5 m/s for 3 s.
    a. Determine your position at the times of 0s; 1s; 2s; and 3s.
    b. Draw the Position versus Time for your travel during this time.
    c. Draw the Velocity versus Time graph for your trip.

Homework

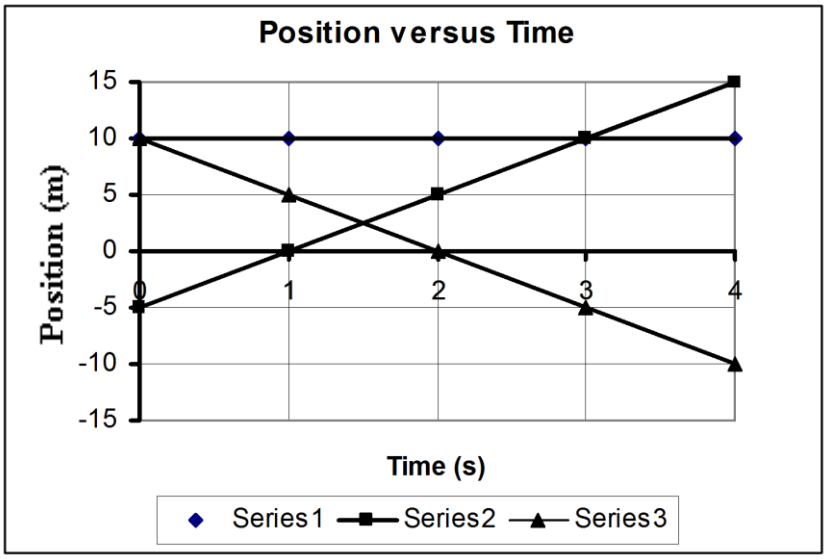
122. Starting at the position, x_0 = 5 m, you travel at a velocity of -10 m/s for 8 s.
    a. Determine your position at the times of 0s; 1s; 2s; and 8s.
    b. Draw the Position versus Time for your travel during this time.
    c. Draw the Velocity versus Time graph for your trip.

123. Starting at the position, x_0 = -17 m, you travel at a velocity of 12 m/s for 6 s.
    a. Determine your position at the times of 0s; 2s; 4s; and 6s.
    b. Draw the Position versus Time for your travel during this time.
    c. Draw the Velocity versus Time graph for your trip.

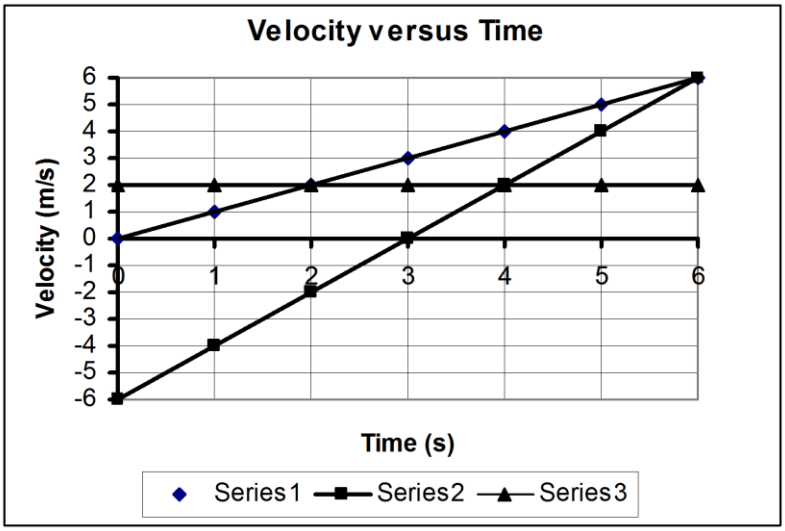
124. Starting at the position, x_0 = 10 m, you travel at a velocity of 4 m/s for 2 s.
    a. Determine your position at the times of 0s; 0.5s; 1s; and 1.5s.
    b. Draw the Position versus Time for your travel during this time.
    c. Draw the Velocity versus Time graph for your trip.

Analyzing Graphs
Class Work

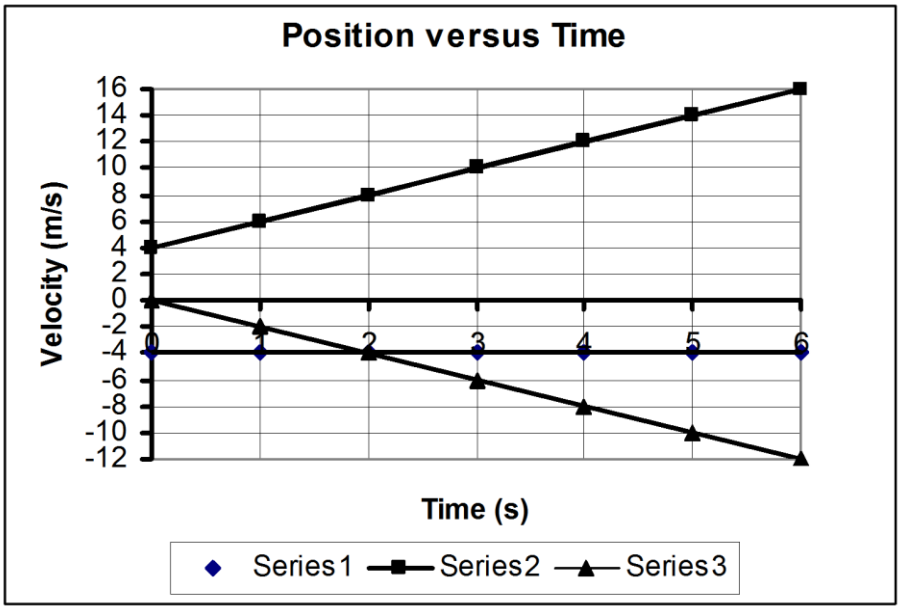
125. The position versus time graph, below, describes the motion of three different cars moving along the x-axis.
    a. Describe, in words, the velocity of each of the cars. Make sure you discuss each car's speed and direction.
    b. Calculate the velocity of each of the cars.
    c. Draw, on one set of axes, the Velocity versus Time graph for each of the three cars.



126. The velocity versus time graph, below, describes the motion of three different cars moving along the x-axis.
    a. Describe, in words, the velocity of each of the cars. Make sure you discuss each car's speed and direction.
    b. Calculate the displacement of each car during its trip.
    c. Calculate the distance traveled by each car during its trip.
    d. Compare your answers to b and c.



127. The position versus time graph, right, describes the motion of three different cars moving along the x-axis.

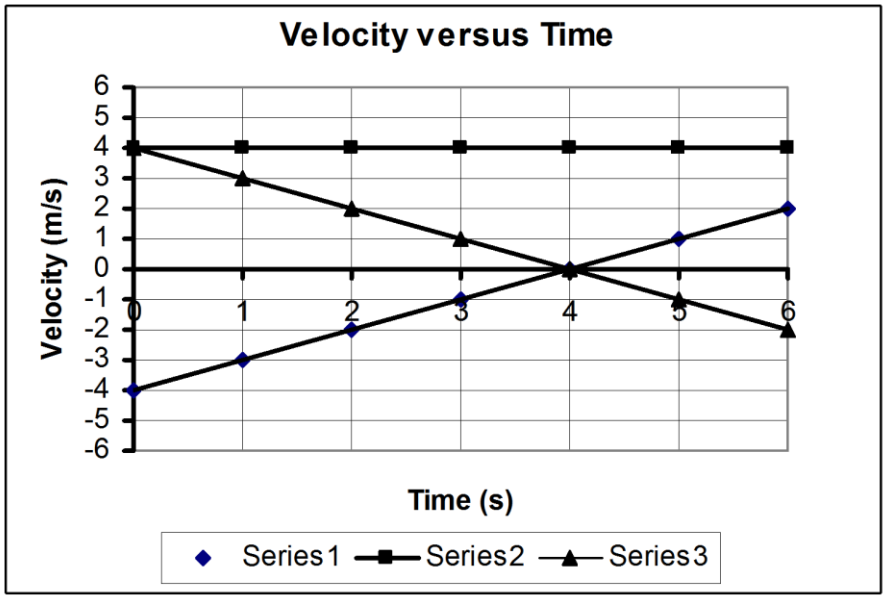


a. Describe, in words, the velocity of each of the cars. Make sure you discuss each car's speed and direction.

b. Calculate the velocity of each of the cars.

c. Draw, on one set of axes, the Velocity versus Time graph for each of the three cars.

128. The velocity versus time graph, right, describes the motion of three different cars moving along the x-axis.



a. Describe, in words, the velocity of each of the cars. Make sure you discuss each car's speed and direction.

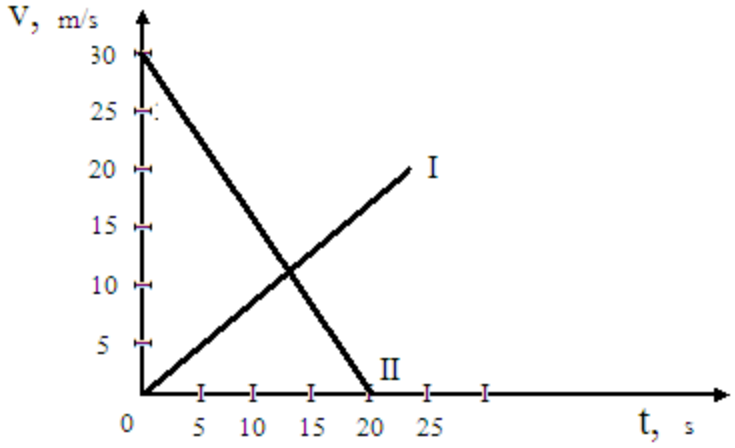
b. Calculate the displacement of each car during its 6 s trip.

c. Calculate the distance traveled by each car during its 6 s trip

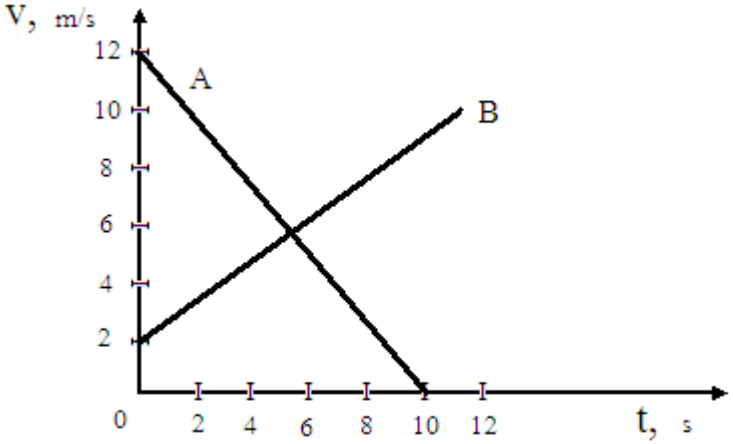
d. Compare your answers to b and c.

Homework

129. A graph of the velocity as a function of time for two cars is presented below.
    a. What is the initial velocity of each car?
    b. What is the acceleration of each car?
    c. What is the traveled distance of the car I at the end of 25 s?
    d. What is the traveled distance of the car II at the end of 20 s
    e. Sketch graphs, on one set of axes, of each car's acceleration as a function of time.



130. A graph of the velocity as a function of time for two objects A and B is presented below.
    a. What is the initial velocity of each object?
    b. What is the acceleration of each object?
    c. What is the traveled distance of the object A at the end of 10 s?
    d. What is the traveled distance of the object B at the end of 12 s?
    e. Sketch clear graphs of the object's acceleration as a function of time.



1) 16 m/s
2) 1250 m
3) 30 s
4) 60 m/s
5) 150 m
6) 2.5 h
7) 4.12 m/s
8) 2040 m
9) 2.08 s
10) 2.67 m/s
11) 6000 m
12) 83.3 s
13) 66.7 km/h
14) 15 m/s
15) 12.5 km
16) 20 s
17) 20 mi/h
18) 58.75 km/h
19) 9.18 m/s
20) 10.32 m/s
21) 46.1 km/h
22) 429 km/h
23) 558 km/h
24) 330 km/h
25) 5.7 m/s
26) 157 km/h
27) 67 km/h
28) 75 km/h (both)
29) 31 m, 2.58 m/s
30) a)140 m
b) 90 m
c) 230 m
d) 3.1 m/s
e) 3.6 m/s
f) 3.3 m/s
g)-140 m
h)+90 m
i) -50 m
j) -3.1 m/s
k) +3.6 m/s
l)-0.71 m/s
31) -49 m, -3.27 m/s
32) a) 30 m
b) 50 m
c) 80 m
d) 3 m/s
e)10 m/s
f) 5.3 m/s
g) +30 m
h) -50 m
i) -20 m
j) +3 m/s
k)-10 m/s
l)-1.3 m/s
33) 29 m, 3.2 m/s
34) a) 65 m
b) 15 m
c) 90 m
d) 8 m/s
e) 5 m/s
f) 6 m/s
g) +40 m
h)-50 m
i)-10 m
j)+8 m/s
k) -5m/s
l)-0.67 m/s
35) 151.2 m/s
36) 53.5 m/s
37) 7.47 m/s^2
38) 5.92 s
39) 14.5 m/s
40) 20.58 m/s
41) 4.8 s
42) 0.8 m/s^2
43) 100 m/s
44) 125 m/s
45) 56.58 m/s
46) 2.8 m/s^2
47) 11 m/s
48) 5.3 s
49) 37 m/s
50) -29.4 m/s
51) -3.6 m/s
52) -35 m/s
53) 34.3 m/s
54) 2.57 s
55) -117.6 m/s
56) -31.6 m/s
57) -7.6 m/s
58) 2.4 s
59) 19.6 m/s
60) 81 m
61) 11.9 m/s
62) 3.6 m/s^2
63) 14.1 s
64) 401.6 m
65) 35 m
66) 22 mi
67) 1.73 m/s^2
68) 60.4 m
69) 2.9 s
70) 528 m
71) 27.0 s
72) 75 m
73) 6.2 s
74) 380 mi north
75) 162.5 m
76) 19.6 m
77) 17.7 m/s
78) 374.55 m/s
79) 5.14 m/s^2
80) 42.3 m
81) 68.15 m/s
82) 36.6 m/s
83) 100.3 m/s^2
84) 214 m
85) -25 m/s
86) 49 m
87) 5.05 m/s
88) 2.97 m/s
89) 566.25 m
90) 92.4 m/s
91) 10.6 m/s, 75.9 m
92) 12 m
93) 8.26 m/s^2
94) 10 s
95) 99.69 m/s
96) 82 m/s
97) 44.1 m
98) 36.1 m/s
99) 4.15 m/s^2
100) 224.4 m
101) -30.99 m/s
102) 39.96 m/s
103) 76 m
104) 6.91 m/s^2
105) 4.52 s
106) 211.75 m
107) 24.1 m/s
108) 122.5 m
109) -22.7 m/s
110) 13.42 m/s
111) 32 m/s
112) 62.5 m
113) 11.025 m
114) 5.82 m/s^2
115) 62.2 m/s
116) 13.86m/s, 1.41s
117) 39.2 m/s, 78.4m
118) 4 m, 8 m, 14 m, 16 m
119) -15 m, -10 m, -5 m, 0 m
120) 12 m, 22 m, 52 m, 62 m
121) -25 m, -30 m, -35 m, -40 m
122) 5 m, -5 m, -15 m, -75 m
123) -17 m, 7 m, 31 m, 55 m
124) 10 m, 12 m, 14 m, 16 m
125) v_1= 0 m/s
v_2= 5 m/s
v_3= -5m/s
126) x_1= 18 m
x_2= 0 m
x_3= 12 m
d_1= 18 m
d_2= 18 m
d_3= 12 m
127) v_1= 0 m/s
v_2= 2 m/s
v_3= -2 m/s
128) x_1= -6 m
x_2= 24 m
x_3= 6 m
d_1= 10 m
d_2= 24 m
d_3= 10 m
129) v_I= 0 m/s
v_{II} = 30 m/s
a_I= 0.8 m/s
a_{II} = -1.5 m/s
d_I= 250 m
d_{II} = 300 m
130) v_A= 12 m/s
v_B = 2 m/s
a_A= -1.2 m/s
a_B = 0.67 m/s
d_A= 60 m
d_B = 72 m

Answers-Chapter Questions

1. Speed
2. Displacement is zero, while distance is 2h
3. Yes, an initial velocity in one direction with the acceleration in the opposite direction, causing it to reverse the direction
4. No, the varying velocity means that the object has a nonzero acceleration, therefore causing a non constant speed
5. Yes
6. Acceleration
7. Yes
8. Yes
9. Yes
10. Displacement
11. Velocity
12. Acceleration

