Linear motion problems worksheet answers

I'm not robot!

PHYSICS   Kinematics Objectives

Students will be able to:

I. Describe the basic VECTOR motion concepts of;

   A. displacement,
   B. velocity,
   C. acceleration,
   D. jerk.

II. Identify a number as being either displacement, velocity, acceleration, jerk or time based solely on its units.

III. List the values given in a word problem.

   A. These values will be listed and identified as either...

      1. initial position
      2. final position
      3. initial velocity
      4. final velocity
      5. average velocity
      6. acceleration
      7. time

   B. Also list the "implied" givens.

IV. From memory, the following formulae will need to listed

   A.
$$x = x_o + v_o t + \frac{1}{2}at^2 \qquad v^2 = (v_o)^2 + 2ax$$
$$v = v_o + at \qquad v_{avg} = \frac{\Delta x}{\Delta t} = \frac{v + v_o}{2}$$

   B. (The student will only be given the left hand side of the equation.)

V. List what the variables of x_o, x, v_o, v, v_{avg}, a and t stand for

VI. Write the proper S.I. units for the variables listed in the previous objective.

VII. Solve word problems while demonstrating proper solution-communication techniques. This includes but is not limited to:
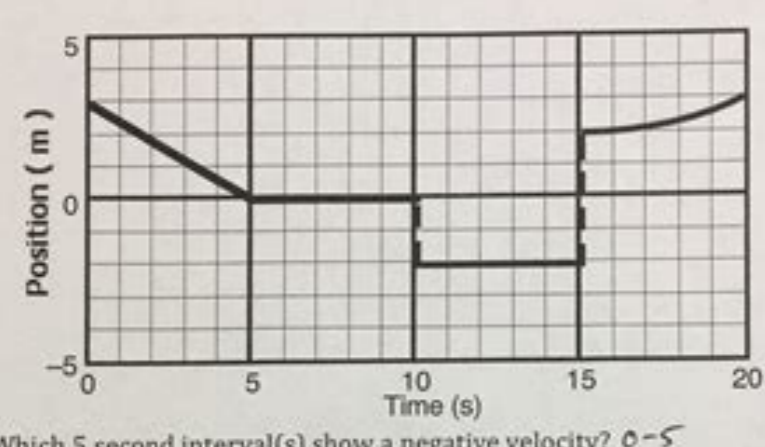
   A. List all the variables in a problem with units
   B. Show the formula(ae) used to solve the problem with only variables
   C. Show the formula(ae) used to solve the problem with only numbers
   D. Show any necessary math
   E. Show the answer with proper units

VIII. Be able to convert between accelerations in m/s^2 and g's.
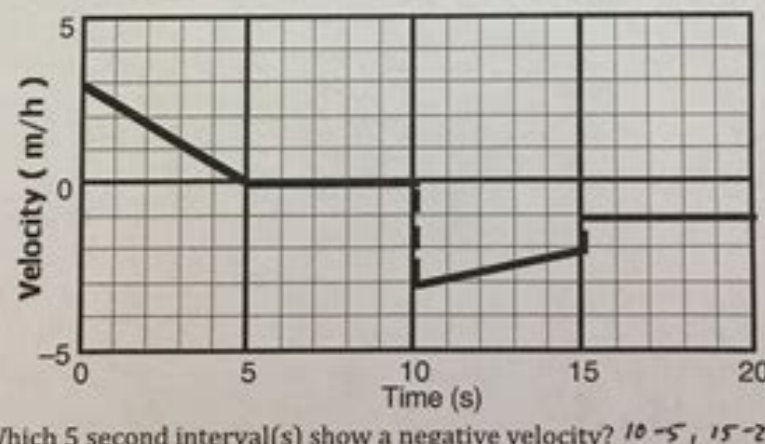

Graphing:

1.

  a. Which 5 second interval(s) show a negative velocity? $0-5$
  b. Which 5 second interval(s) show a positive acceleration? $15-20$
  c. Which 5 second interval(s) show a velocity that is constant? $0-5, 5-10, 10-15$
  d. Which 5 second interval(s) show a velocity of zero? $5-10, 10-15$
  e. What is the velocity at 6 seconds? $0\ m/s$
  f. What is the velocity at 19 seconds? $\cdot 5\ m/s$
  g. What is the displacement from 5 to 15 seconds? $-2\ m/s$
  h. What are the units of slope from the graph above? m/s

2.

  a. Which 5 second interval(s) show a negative velocity? $10-5, 15-20$
  b. Which 5 second interval(s) show a positive acceleration? $10-15$
  c. Which 5 second interval(s) show a velocity that is constant? $5-10, 15-20$
  d. Which 5 second interval(s) show a velocity of zero? $5-10$
  e. What is the velocity at 6 seconds? $0\ m/s$
  f. What is the velocity at 19 seconds? $-1\ m/s$
  g. What are the units of slope from the graph above? $m/s2$

Laura throws a ball vertically. She notices it reaches a maximum height of 10 meters. What was the initial velocity of the ball? Possible Answers: Correct answer: Explanation: Remember that at the highest point, the velocity in the y-direction is equal to zero. Using the given values and the equation below, we can solve for the initial velocity. Marcus throws a ball directly up in the air with an initial velocity of . How high will the ball go? Possible Answers: Correct answer: Explanation: Remember that the final velocity at an object's highest point is equal to zero. We can use the following equation to solve for our height (), using the initial velocity, final velocity, and acceleration due to gravity. A picture hanging above the ground falls off the wall and hits the ground. What is its final velocity? Possible Answers: Correct answer: Explanation: The problem gives us the distance, the acceleration due to gravity, and implies that the initial velocity of the picture is zero, as it starts at rest. We can find the final velocity using the appropriate motion equation: We can use our values to solve for the final velocity. Keep in mind that the displacement will be negative because the ball is traveling in the downward direction! The square root of a term can be either positive or negative, depending on the direction. Since velocity is a vector, and the painting is falling downward, our final answer will be negative: . An object moves at a constant velocity, , for some distance, . How long it in motion? Possible Answers: Correct answer: Explanation: The relationship between velocity, distance, and time is: We can multiply both sides by the time, then divide both sides by the velocity, to isolate the variable for time. The quotient of distance and velocity will give us the time that the object was in motion. A ball is thrown vertically with a velocity of . What is its velocity at the highest point in the throw? Possible Answers: There is insufficient information to solve Correct answer: Explanation: When examining vertical motion, the vertical velocity will always be zero at the highest point. At this point, the acceleration from gravity is working to change the motion of the ball from positive (upward) to negative (downward). This change is represented by the x-axis on a velocity versus time graph. As the ball changes direction, its velocity crosses the x-axis, momentarily becoming zero. Part of competing in a triathlon involves swimming in the open water. Suppose a woman competing swims at a speed of in still water and needs to swim . On the day of this particular race, there is an opposing current of going directly against the swimmer. How long does it take for her to finish the swim? Possible Answers: Correct answer: Explanation: The woman needs to swim , or . She normally swims at , but has a current opposing her. The effect will make her relative velocity equal to her normal velocity, minus the current against her. We know that velocity is a change in distance divided by a change in time. Now that we have her relative velocity and the distance traveled, we can isolate the time variable and solve for that time. Suppose a recreational biker averages on a twenty-mile ride, equal to . A professional biker has an average speed of . The professional happens to be riding on the same path, but started behind the recreational biker. The two are both headed for the same destination. Who would reach the end of the path first, and how far behind would the other biker be? Possible Answers: The recreational finishes first and the other biker is behind Both bikers reach destination at same time The professional finishes first and the other biker is behind Correct answer: The professional finishes first and the other biker is behind Explanation: To solve this problem we can simply examine each biker separately and see how long it would take them to reach the destination. Let's begin with the recreational biker. The recreational biker needs to ride at . Using the definition of velocity, we can find his final time. The professional has a distance of , plus the that he's behind. We know that the velocity of the professional biker is . Using this velocity and his total distance, we can find the time that it takes him to reach the end of the path. The time of the professional biker is less than that of the recreational biker, meaning that the professional will finish first. Now we need to find the distance between the two bikers at this point. Use the recreational biker's velocity and the time difference between the two bikers to solve for the distance that the recreational biker has left on the path. The recreational biker will ride for at to finish the path. A picture hanging above the ground falls off the wall and hits the ground. How long will it be before it hits the ground? Possible Answers: Correct answer: Explanation: The problem gives us the distance, the acceleration due to gravity, and implies that the initial velocity of the picture is zero, as it starts at rest. We can use the appropriate motion equation to solve for the final velocity: We can use our values to solve for the ground. A ball rolls along a table with a constant velocity of . If it rolls for , how long was it rolling? Possible Answers: Correct answer: Explanation: The relationship between constant velocity, distance, and time can best be illustrated as . We are given the velocity and the distance, allowing us to solve for the time that the ball was in motion. Isolate the variable for time. Dr. Dillieanna Certified Tutor Walden University, Masters in Business Administration, Business Administration and Management. Nancy Certified Tutor The University of Texas at Austin, Associate in Arts, Psychobiology. University of Washington-Seattle Campus, Doctor of Educa... If you've found an issue with this question, please let us know. With the help of the community we can continue to improve our educational resources. If you believe that content available by means of the Website (as defined in our Terms of Service) infringes one or more of your copyrights, please notify us by providing a written notice ("Infringement Notice") containing the information described below to the designated agent listed below. 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Please follow these steps to file a notice: You must include the following: A physical or electronic signature of the copyright owner or a person authorized to act on their behalf; An identification of the copyright claimed to have been infringed; A description of the nature and exact location of the content that you claim to infringe your copyright, in \ sufficient detail to permit Varsity Tutors to find and positively identify that content; for example we require a link to the specific question (not just the name of the question) that contains the content and a description of which specific portion of the question – an image, a link, the text, etc – your complaint refers to; Your name, address, telephone number and email address; and A statement by you: (a) that you believe in good faith that the use of the content that you claim to infringe your copyright is not authorized by law, or by the copyright owner or such owner's agent; (b) that all of the information contained in your Infringement Notice is accurate, and (c) under penalty of perjury, that you are either the copyright owner or a person authorized to act on their behalf. Send your complaint to our designated agent at: Charles Cohn Varsity Tutors LLC 101 S. Hanley Rd, Suite 300 St. Louis, MO 63105 Or fill out the form below: Problems on velocity and uniform acceleration are presented along with detailed solutions and tutorials can also be found in this website.Problem 1:From rest, a car accelerated at 8 m/s2 for 10 seconds.a) What is the position of the car at the end of the 10 seconds?b) What is the velocity of the car at the end of the 10 seconds? Solution to Problem 1Problem 2:With an initial velocity of 20 km/h, a car accelerated at 8 m/s2 for 10 seconds.a) What is the position of the car at the end of the 10 seconds?b) What is the velocity of the car at the end of the 10 seconds? Solution to Problem 2Problem 3:A car accelerates uniformly from 0 to 72 km/h in 11.5 seconds.a) What is the acceleration of the car in m/s2?b) What is the position of the car by the time it reaches the velocity of 72 km/h? Solution to Problem 3Problem 4:An object is thrown straight down from the top of a building at a speed of 20 m/s. It hits the ground with a speed of 40 m/s.a) How high is the building?b) How long was the object in the air? Solution to Problem 4Problem 5:A train brakes from 40 m/s to a stop over a distance of 100 m.a) What is the acceleration of the train?b) How much time does it take the train to stop? Solution to Problem 5Problem 6:A boy on a bicycle increases his velocity from 5 m/s to 20 m/s in 10 seconds.a) What is the acceleration of the bicycle?b) What distance was covered by the bicycle during the 10 seconds? Solution to Problem 6Problem 7:a) How long does it take an airplane to take off if it needs to reach a speed on the ground of 350 km/h over a distance of 600 meters (assume the plane starts from rest)?b) What is the acceleration of the airplane over the 600 meters? Solution to Problem 7Problem 8:Starting from a distance of 20 meters to the left of the origin and at a velocity of 10 m/s, an object accelerates to the right of the origin for 5 seconds at 4 m/s2. What is the position of the object at the end of the 5 seconds of acceleration? Solution to Problem 8Problem 9:What is the smallest distance, in meters, needed for an airplane touching the runway with a velocity of 360 km/h and an acceleration of -10 m/s2 to come to rest? Solution to Problem 9Problem 10:To approximate the height of a water well, Martha and John drop a heavy rock into the well. 8 seconds after the rock is dropped, they hear a splash caused by the impact of the rock on the water. What is the height of the well? (Speed of sound in air is 340 m/s). Solution to Problem 10Problem 11:A rock is thrown straight up and reaches a height of 10 m.a) How long was the rock in the air?b) What is the initial velocity of the rock? Solution to Problem 11Problem 12:A car accelerates from rest at 1.0 m/s2 for 20.0 seconds along a straight road . It then moves at a constant speed for half an hour. It then decelerates uniformly to a stop in 30.0 s. Find the total distance covered by the car. Solution to Problem 12

A) The two objects have momenta with equal magnitudes. B) The magnitude of the momentum of A is greater than the magnitude of the momentum of B. C) The magnitude of the momentum of A is smaller than the magnitude of the momentum of B. D) The two objects have equal masses. E) Mass of object A is smaller than mass of object B. 7/8/2021 · Solution: This motion is divided into two parts. First, draw a diagram and specify each section with its known kinematics quantities. (a) In the first part, given the acceleration, initial velocity, and time interval, we can find its final ... One would be to use the fact stated in the stem of the problem — that the skydiver was in free fall. We could use the first equation of motion for an object with a constant acceleration. Up is positive on this graph, so gravity will have to be negative. v = ... Chapter 4: Linear Motion Chapter Exam Instructions. Choose your answers to the questions and click 'Next' to see the next set of questions. You can skip questions if you would like and come back ... Grade 9 Linear Graphing.pdf. File Size: 204 kb. File Type: pdf. Download File. Grade 9 Slopes and the Equation of a Line - Answer Key.pdf. File Size: 89 kb. Free questions and problems related to the SAT test and tutorials on rectilinear motion with either uniform velocity or uniform acceleration are included. The concepts of displacement, distance, velocity, speed, acceleration are thoroughly discussed. Problems, questions and examples are presented with solutions and detailed explanations. position → velocity → acceleration. integral. position ← velocity ← acceleration. Of course, with integration, an unknown constant is introduced. So, you will often be given a value that allows you to determine the unknown constant. This value is often called an initial condition. If the value is a position, it may be called an initial ... 5/10/2011 · 1. I can explain a motion map. 2. I can relate mass, size, and shape of an object to gravity's effect on that object. 3. I can calculate acceleration. - Notes: Motion Part 4 - Motion Maps - Motion Map Worksheet - Inquiry Activity: Free-Falling - ... In this page find physics numerical for class 9 motion with answers as per CBSE syllabus. ... (approx). Calculate its linear velocity if takes 24 hour to revolve around earth.? Answer. Given r =42.250 km , T= 24 hour ... Download Numerical Motion Problems and Solution worksheet as pdf link to this page by copying the following text

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