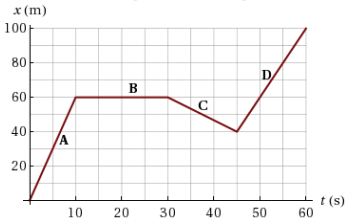
Physics Problem Set 2 - Week 2 (5620108)

Question 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1. Question Details OSColPhys1 2.P.043.WA. [2707255]

An athlete is training on a 100 m long linear track. His motion is described by the graph of his position vs. time, below.



(a) For each segment of the graph, find the magnitude and direction of the athlete's velocity.

magnitude v_A [ ] 6 m/s
direction v_A ---Select---
magnitude v_B [ ] 0 m/s
direction v_B ---Select---
magnitude v_C [ ] 1.33 m/s
direction v_C ---Select---
magnitude v_D [ ] 4 m/s
direction v_D ---Select---

(b) What are the magnitude and direction of the athlete's average velocity over the entire 60 s interval?

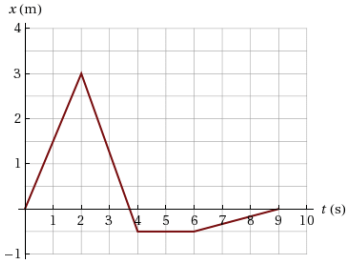
magnitude [ ] 1.67 m/s
direction ---Select---

Supporting Materials

Physical Constants

2. Question Details OSColPhys1 2.P.044.WA. [2707249]

A child operates a remote controlled toy car on a linear track. The figure below plots the car's position as a function of time.



Find the velocity of the toy car over the following time intervals. Indicate the direction with the sign of your answer.

(a) From 0 s to 2 s
[ ] 1.5 m/s

(b) From 2 s to 4 s
[ ] -1.75 m/s

(c) From 4 s to 6 s
[ ] 0 m/s

(d) From 6 s to 9 s
[ ] 0.167 m/s

Supporting Materials

Physical Constants

3. Question Details OSColPhys1 2.P.042.Tutorial.WA. [2707433]

(a) The graph below plots the **position** versus time for an object moving in one dimension along the x direction.

What is the speed (magnitude of velocity) of the object at t = 2.5 s?

1.33 m/s

What direction is the object moving along that time?

- +x
- −x
- The object is not moving.

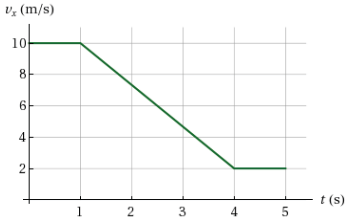
What is the acceleration of the object at t = 2.5 s? (Indicate the direction with the sign of your answer.)

0 m/s^2

Is the speed increasing, decreasing or constant at that time?

- increasing
- decreasing
- constant

(b) The graph below plots the **velocity** versus time for an object, different from the one in part (a), moving in one dimension along the x direction.



What is the speed (magnitude of velocity) of the object at t = 2.5 s?

6 m/s

What direction is the object moving along that time interval?

- +x
- −x
- The object is not moving.

What is the acceleration of the object at t = 2.5 s? (Indicate the direction with the sign of your answer.)

-2.67 m/s^2

Is the speed increasing, decreasing or constant at that time?

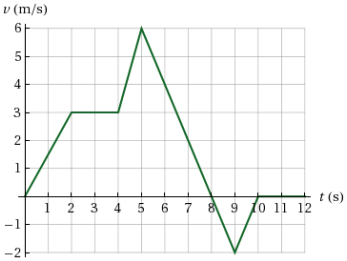
- increasing
- decreasing
- constant

Supporting Materials

Physical Constants

4. Question Details OSColPhys1 2.P.045.WA. [2707296]

A particle is restricted to move along one dimension, the x-axis. The graph below plots the velocity of the particle as a function of time.



(a) What is the acceleration of the particle during the following intervals? Indicate the direction with the sign of your answer.

0 s to 2 s	1.5 m/s^2
2 s to 4 s	0 m/s^2
4 s to 5 s	3 m/s^2
5 s to 9 s	-2 m/s^2
9 s to 10 s	2 m/s^2
10 s to 12 s	0 m/s^2

(b) At the following instants in time, what is the direction of the particle's velocity?

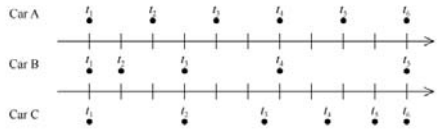
t = 1.0 s	---Select---
t = 3.0 s	---Select---
t = 6.0 s	---Select---
t = 8.0 s	---Select---
t = 8.5 s	---Select---
t = 9.5 s	---Select---
t = 11.0 s	---Select---

Supporting Materials

Physical Constants

5. Question Details OSColPhys1 2.P.017.WA. [2707320]

Suppose you are looking down from a helicopter at three cars traveling in the same direction along a freeway. The positions of the three cars every 2 seconds are represented by dots on the diagram. The positive direction is to the right.



(a) Which car is traveling at a constant speed?
- Car A
- Car B
- Car C
- All cars are traveling at a constant speed.
- None of the cars are traveling at a constant speed.

(b) During which time interval do Car A and Car B have the same average speed?
- t_1 to t_2
- t_2 to t_3
- t_3 to t_4
- t_4 to t_5

(c) Which car has the greatest average velocity during the time interval t_1 to t_2?
- Car A
- Car B
- Car C

(d) Which car has the greatest average velocity during the time interval t_4 to t_5?
- Car A
- Car B
- Car C

(e) At which time does Car B catch up with Car A?
- t_2
- t_3
- t_4
- t_5

(f) During what time interval does Car C pass Car A?

- t_1 to t_2
- t_2 to t_3
- t_3 to t_4
- t_4 to t_5

(g) At what time does Car A catch Car C?
- t_2
- t_3
- t_4
- t_5
- t_6

(h) During what time interval does Car B pass Car C?
- t_1 to t_2
- t_2 to t_3
- t_3 to t_4
- t_4 to t_5

(i) Which car has an acceleration in the positive direction?
- Car A
- Car B
- Car C

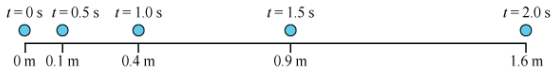
(j) Which car has an acceleration in the negative direction?
- Car A
- Car B
- Car C

Supporting Materials

Physical Constants

6. Question Details OSColPhys1 2.P.016.Tutorial.WA. [2707319]

A remote controlled toy car starts from rest and begins to accelerate in a straight line. The figure below represents "snapshots" of the car's position at equal 0.5 s time intervals. (Assume the positive direction is to the right. Indicate the direction with the sign of your answer.)



(a) What is the car's average velocity in the interval between t = 0.5 s to t = 1.0 s?
0.6 m/s

(b) Using data from t = 0.5 s to t = 1.5 s, what is the car's acceleration at t = 1.0 s?
0.8 m/s^2

(c) Is the car's speed increasing or decreasing with time?
- increasing
- decreasing
- constant
- not enough information

Supporting Materials
Physical Constants

7. Question Details OSColPhys1 2.4.018. [2153220]

A commuter backs her car out of her garage with a constant acceleration of 1.40 m/s^2.

(a) How long does it take her to reach a speed of 2.20 m/s?
1.57 s

(b) If she then brakes to a stop in 0.8 s, what is her (constant) deceleration?
2.75 m/s^2

8. Question Details OSColPhys1 2.5.023. [2153699]

(a) A light-rail commuter train accelerates at a rate of 1.45 m/s^2. How long does it take it to reach its top speed of 80.0 km/h starting from rest?
15.3 s

(b) The same train ordinarily decelerates at a rate of 2 m/s^2. How long does it take to come to a stop from its top speed?
11.1 s

(c) In emergencies the train can decelerate more rapidly, coming to rest from 80.0 km/h in 8.30 s. What is its emergency deceleration in m/s^2?
2.68 m/s^2

9. Question Details OSColPhys1 2.P.014.WA. [2707862]

A plane lands on a runway with a speed of 105 m/s, moving east, and it slows to a stop in 11.0 s. What is the magnitude and direction of the plane's average acceleration during this time interval?
magnitude 9.55 m/s^2
direction ---Select--- due west

Supporting Materials
Physical Constants

10. Question Details OSColPhys1 2.P.015.WA. [2707399]

An Olympic track runner starts from rest and has an acceleration of 2.5 m/s^2 for 3.9 s, then has zero acceleration for the remainder of the race. Find the runner's speed at the following times.

(a) at time t = 2.1 s
5.25 m/s

(b) the end of the race
9.75 m/s

Supporting Materials
Physical Constants

11. Question Details OSColPhys1 2.P.018.WA. [2707417]

A snowboarder on a slope starts from rest and reaches a speed of 3.2 m/s after 8.2 s.

(a) What is the magnitude of the snowboarder's average acceleration?
0.39 m/s^2

(b) How far does the snowboarder travel in this time?
13.1 m

Supporting Materials
Physical Constants

12. Question Details OSColPhys1 2.5.028. [2153674]

A powerful motorcycle can accelerate from rest to 29.8 m/s (67 mi/h) in only 3.90 s.

(a) What is its (constant) acceleration?
7.64 m/s^2

(b) How far does it travel in that time?
58.1 m

13. Question Details OSColPhys1 2.P.019.WA. [2707267]

Starting from rest, a runner at a track meet reaches a speed of 9.6 m/s in 1.5 s. How far does she run during this time, assuming her acceleration is uniform?

[ ] 7.2 m

Supporting Materials

Physical Constants

14. Question Details OSColPhys1 2.5.024. [2153612]

At the end of a race a runner decelerates from a velocity of 11.00 m/s at a rate of 0.500 m/s^2.

(a) How far does she travel in the next 14.0 s?

[ ] 105 m

(b) What is her final velocity?

[ ] 4 m/s

15. Question Details OSColPhys1 2.5.027. [2153227]

In a slap shot a hockey player accelerates the puck from a velocity of 9.00 m/s to 50.0 m/s in the same direction. If this takes 3.33×10^{-2} s, calculate the distance over which the acceleration acts.

[ ] 0.982 m

16. Question Details OSColPhys1 2.P.027.WA. [2707335]

Starting from rest, a truck travels in a straight line for 7.0 s with a uniform acceleration of +2.0 m/s^2. The driver then applies the brakes for 3.0 s, causing a uniform acceleration of −3.0 m/s^2 over that time.

(a) What is the truck's speed at the end of the braking period?

[ ] 5 m/s

(b) What is the total distance traveled by the truck (from the point where it started at rest to the end of the braking period)?

[ ] 77.5 m

Supporting Materials

Physical Constants

17. Question Details OSColPhys1 2.P.028.WA. [2707393]

Starting from rest, a runner reaches a speed of 3.0 m/s in 2.3 s. In the same 2.3 s time, a motorcycle increases speed from 36.0 to 44.0 m/s. In both cases, assume the acceleration is constant.

(a) What is the acceleration (magnitude only) of the runner?

[ ] 1.3 m/s^2

(b) What is the acceleration (magnitude only) of the motorcycle?

[ ] 3.48 m/s^2

(c) Does the motorcycle travel farther than the runner during the 2.3 s?

- Yes
- No

If so, how much farther? (If not, enter zero.)

[ ] 88.6 m

Supporting Materials

Physical Constants

18. Question Details OSColPhys1 2.5.038. [2153817]

A bicycle racer sprints at the end of a race to clinch a victory. The racer has an initial velocity of 11.5 m/s and accelerates at the rate of 0.450 m/s^2 for 7.00 s.

(a) What is his final velocity?

[ ] 14.7 m/s

(b) The racer continues at this velocity to the finish line. If he was 300 m from the finish line when he started to accelerate, how much time did he save?

[ ] 4.86 s

(c) One other racer was 5.00 m ahead when the winner started to accelerate, but he was unable to accelerate and traveled at 11.8 m/s until the finish line. How far ahead of him (in meters and in seconds) did the winner finish?

distance

[ ] 44.5 m

time

[ ] 3.77 s

Assignment Details

Name (AID): **Physics Problem Set 2 - Week 2 (5620108)**
Submissions Allowed: **5**
Category: **Homework**
Code:
Locked: **No**
Author: **Chowdary, Krishna** (chowdark@evergreen.edu)
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