

Name _____

Physics July Summer Assignment

Please e-mail this assignment to muerling@youngstowndiocese.org no later than July 30. If you work is submitted early enough, you will receive comments and a chance to fix any mistakes. Look on the class website (<https://sites.google.com/a/youngstowndiocese.org/mr-uerling-classes/home/physics>) for notes and a video tutorial.

1) The captain orders his starship to accelerate from rest at a rate of "1 g" ($1 g = 9.8 \text{ m/s}^2$). How many days does it take the starship to reach 10% the speed of light? (Light travels at $3.0 \times 10^8 \text{ m/s}$.)

2) An object moving in the $+x$ direction experiences an acceleration of $+2.0 \text{ m/s}^2$. This means the object

- A) travels 2.0 m in every second.
- B) is traveling at 2.0 m/s.
- C) is decreasing its velocity by 2.0 m/s every second.
- D) is increasing its velocity by 2.0 m/s every second.

3) Suppose that a car traveling to the east ($+x$ direction) begins to slow down as it approaches a traffic light. Which statement concerning its acceleration must be correct?

- A) Its acceleration is in the $+x$ direction.
- B) Its acceleration is in the $-x$ direction.
- C) Its acceleration is zero.
- D) Its acceleration is decreasing in magnitude as the car slows down.

4) Suppose that a car traveling to the west ($-x$ direction) begins to slow down as it approaches a traffic light. Which statement concerning its acceleration must be correct?

- A) Its acceleration is positive.
- B) Its acceleration is negative.
- C) Its acceleration is zero.
- D) Its acceleration is decreasing in magnitude as the car slows down.

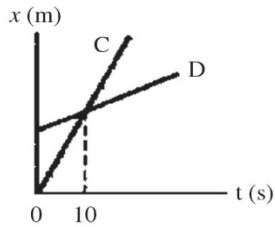
5) If the velocity of an object is zero at one instant, what is true about the acceleration of that object? (There could be more than one correct choice.)

- A) The acceleration could be positive.
- B) The acceleration could be negative.
- C) The acceleration could be zero.
- D) The acceleration must be zero.

6) An airplane increases its speed at the average rate of 15 m/s^2 . How much time does it take to increase its speed from 100 m/s to 160 m/s?

- A) 17 s
- B) 0.058 s
- C) 4.0 s
- D) 0.25 s

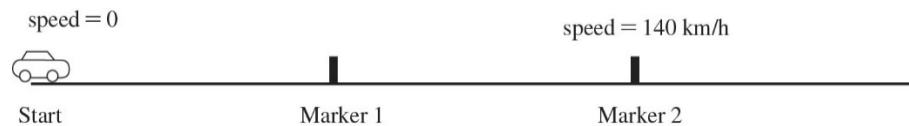
7) The figure shows a graph of the position x of two cars, C and D, as a function of time t .



According to this graph, which statements about these cars must be true? (There could be more than one correct choice.)

- A) The magnitude of the acceleration of car C is greater than the magnitude of the acceleration of car D.
- B) The magnitude of the acceleration of car C is less than the magnitude of the acceleration of car D.
- C) At time $t = 10$ s, both cars have the same velocity.
- D) Both cars have the same acceleration.
- E) The cars meet at time $t = 10$ s.

8) A racing car accelerates uniformly from rest along a straight track. This track has markers spaced at equal distances along it from the start, as shown in the figure. The car reaches a speed of 140 km/h as it passes marker 2.



Where on the track was the car when it was traveling at half this speed, that is at 70 km/h?

- A) Before marker 1
- B) At marker 1
- C) Between marker 1 and marker 2

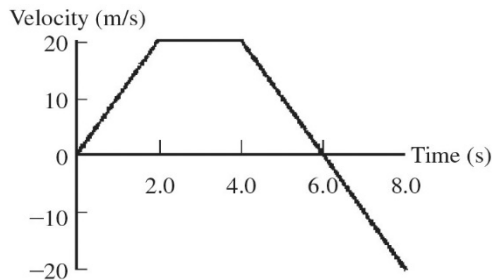
9) The figure shows a graph of the velocity of an object as a function of time. What is the acceleration of the object at the following times?

(a) At 1.0 s

(b) At 3.0 s

(c) At 6.0 s

(d) What is the distance traveled from 0 to 2.0 sec? 2.0 to 4.0 sec? 4.0 to 8.0 sec?



10) A racquetball strikes a wall with a speed of 30 m/s and rebounds in the opposite direction with a speed of 26 m/s. The collision takes 20 ms. What is the average acceleration of the ball during the collision with the wall?

A) 0 m/s²

B) 200 m/s²

C) 2800 m/s²

D) 1500 m/s²

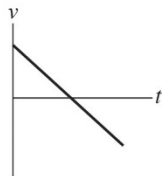
E) 1300 m/s²

11) If a car accelerates at a uniform 4.0 m/s², how long will it take to reach a speed of 80 km/hr, starting from rest?

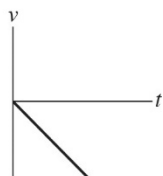
12) How far does the car in number 11 travel by the time it reaches 80 km/hr?

13) A child standing on a bridge throws a rock straight down. The rock leaves the child's hand at time $t = 0$ s. If we take upward as the positive direction, which of the graphs shown below best represents the velocity of the stone as a function of time?

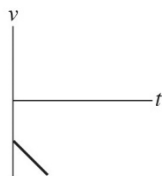
A)



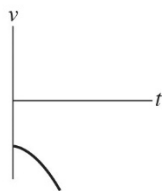
B)



C)



D)



E)

