

Name _____

Physics July Summer Assignment

Please e-mail this assignment to muerling@youngstowndiocese.org no later than July 30. If your 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.

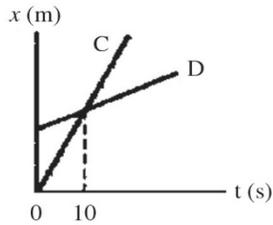
- 3) Suppose that a car traveling to the east ($+x$ direction) begins to slow down as it approaches a traffic light. Which statement concerning its acceleration must be correct?
 - A) Its acceleration is in the $+x$ direction.
 - B) Its acceleration is in the $-x$ direction.
 - C) Its acceleration is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

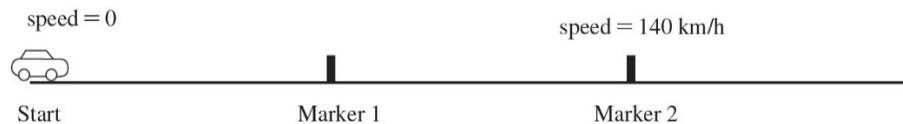
7) The figure shows a graph of the position x of two cars, C and D, as a function of time t .



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

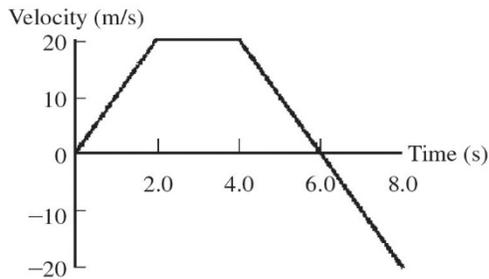
9) The figure shows a graph of the velocity of an object as a function of time. What is the acceleration of the object at the following times?

(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

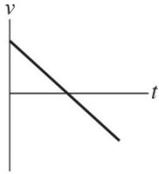
E) 1300 m/s²

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?

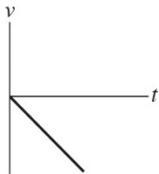
12) How far does the car in number 11 travel by the time it reaches 80 km/hr?

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?

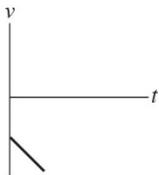
A)



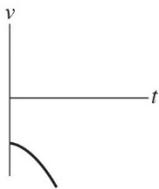
B)



C)



D)



E)

