

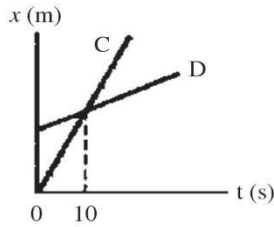
Name \_\_\_\_\_

Physics July Summer Assignment

Please e-mail this assignment to [muerling@youngstowndiocese.org](mailto:muerling@youngstowndiocese.org) or submit it to Google Classroom no later than July 30. If your work is submitted early enough, you will receive comments and a chance to fix any mistakes.

- 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  $15 \text{ m/s}^2$ . 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.



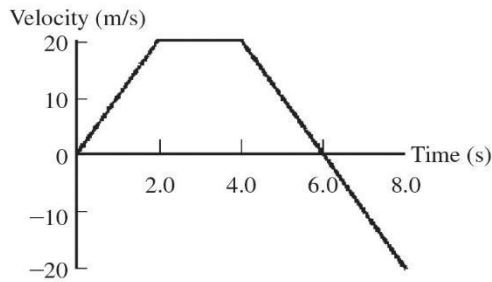
Where on the track was the car when it was traveling at half this speed, that is at 70 km/h?

- 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?

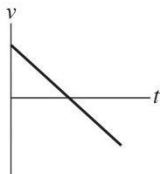
- A)  $0 \text{ m/s}^2$
- B)  $200 \text{ m/s}^2$
- C)  $2800 \text{ m/s}^2$
- D)  $1500 \text{ m/s}^2$
- E)  $1300 \text{ m/s}^2$

11) If a car accelerates at a uniform  $4.0 \text{ m/s}^2$ , how long will it take to reach a speed of 80 km/hr, starting from rest?

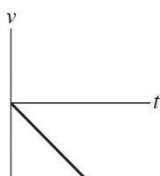
12) How far does the car in number 11 travel by the time it reaches 80 km/hr?

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?

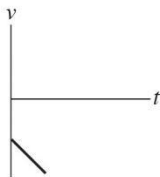
A)



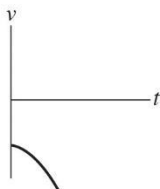
B)



C)



D)



E)

