



**True / False:**

Indicate whether the statement is true or false:

- \_\_\_\_\_ 1. The velocity of an object refers to the rate at which the object's position changes.
- \_\_\_\_\_ 2. The quantity 20 m/s, north is a speed and as such is a scalar quantity.
- \_\_\_\_\_ 3. The direction of the acceleration vector is dependent upon two factors: the direction the object is moving and whether the object is speeding up or slowing down.
- \_\_\_\_\_ 4. The unit for the measurement of acceleration is  $\text{m}\cdot\text{s}^{-1}$ .

**Multiple Choices (circle the correct answer)**

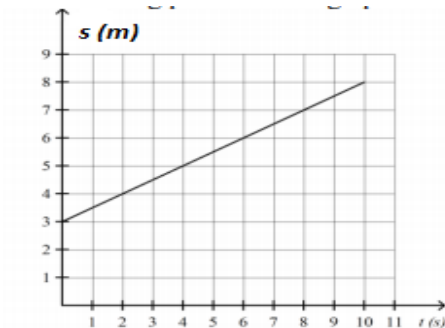
\_\_\_\_\_ 5. The area under a velocity-time graph always represents

- a. displacement
- b. acceleration
- c. change in velocity
- d. change in acceleration

\_\_\_\_\_ 6. A sports car reaches a speed of 50 m/s in 12 seconds after starting from rest. The acceleration of the car is:

- a.  $0.24 \text{ m/s}^2$ .
- b.  $4.17 \text{ m/s}^2$ .
- c.  $38 \text{ m/s}^2$ .
- d.  $50 \text{ m/s}^2$ .

\_\_\_\_\_ 7. The motion of an object is shown in the following position-time graph. What is the objects speed?



- a. 0.5 m/s
- b. 0.8 m/s
- c. 1.3 m/s
- d. 2 m/s

\_\_\_\_\_ 8. If the position vs time graph of an object is a horizontal line, the object is

- a. moving with a constant non-zero speed.

- c. at rest.
- b. moving with constant non-zero acceleration.

\_\_\_\_\_ **9.** If the velocity vs time graph of an object is a horizontal line, the object is

- a. moving with a constant non-zero speed.
- c. at rest.
- b. moving with constant non-zero acceleration.

\_\_\_\_\_ **10.** The slope of a position – time graph always represents:

- a. displacement
- b. acceleration
- c. velocity
- d. distance

\_\_\_\_\_ **11.** The area under a velocity – time graph always represents:

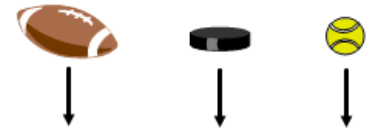
- a. displacement
- b. acceleration
- c. velocity
- d. distance

\_\_\_\_\_ **12.** Starting from the origin, a car travels 4 km east and then 7 km west. What is the traveled distance of the car from the initial point?

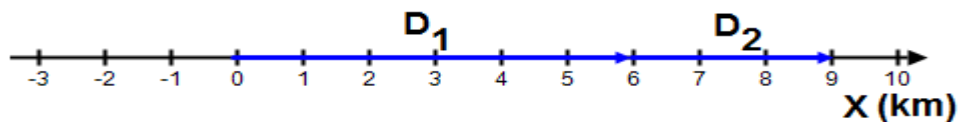
- a. 3 km
- b. 3 km
- c. 4 km
- d. 7 km
- e. 11 km

\_\_\_\_\_ **13.** A football, a hockey puck, and a tennis ball all fall down in the absence of air resistance. Which of the following is true about their acceleration?

- a. The acceleration of the football is greater than the other two
- b. The acceleration of the hockey puck is greater than the other two
- c. The acceleration of the tennis ball is greater than the other two
- d. They all fall down with the same constant acceleration

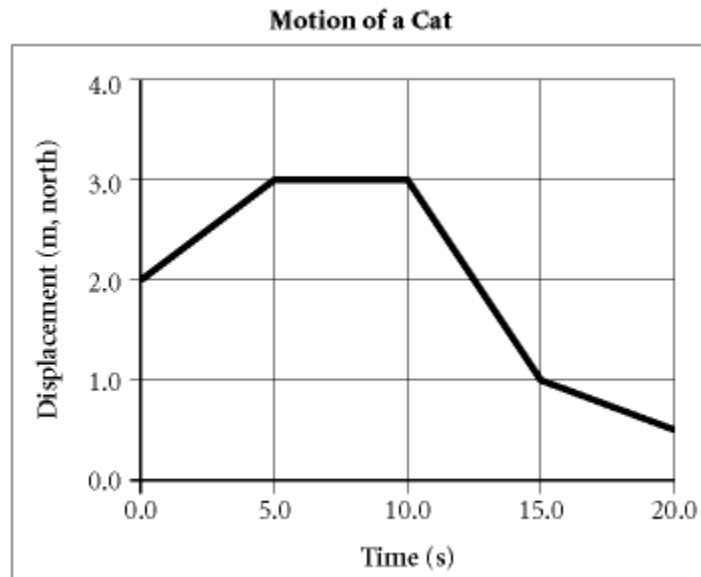


\_\_\_\_\_ **14.** Starting from the origin, a person walks 6 km east during first day, and 3 km east the next day. What is the net displacement of the person from the initial point in two days?



- a. 6 km, west
- b. 3 km, east
- c. 10 km, east
- d. 5 km, west
- e. 9 km, east

Refer to the graph below to answer the following questions:



\_\_\_ 1. According to the graph above, during which interval is the cat at rest?

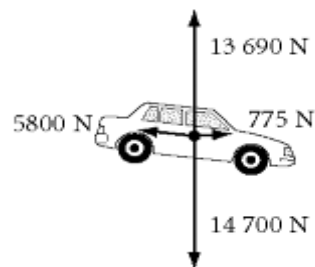
- a. 0.0–5.0 s                      b. 10.0–15.0 s   c. 5.0–10.0 s   d. 15.0–20.0 s

\_\_\_ 2. According to the graph above, the cat has the fastest speed during which interval?

- a. 0.0–5.0 s                      b. 10.0–15.0 s   c. 5.0–10.0 s   d. 15.0–20.0 s

\_\_\_ 3. According to the graph above, during which interval does the cat have the greatest positive velocity?

- a. 0.0–5.0 s                      b. 10.0–15.0 s   c. 5.0–10.0 s   d. 15.0–20.0 s



\_\_\_ 4. The free-body diagram shown above represents a car being pulled by a towing cable. In the diagram, which of the following is the gravitational force acting on the car?

a. 5800 N

b. 14 700 N

c. 775 N

d. 13 690 N

\_\_\_\_ 5. The free-body diagram shown above represents a car being pulled by a towing cable. In the diagram, the 5800 N force is

a. the gravitational force acting on the car.

b. the backward force the road exerts on the car.

c. the upward force the road exerts on the car.

d. the force exerted by the towing cable on the car.

\_\_\_\_ 6. If a nonzero net force is acting on an object, then the object is definitely

a. at rest.

b. being accelerated.

c. moving with a constant velocity.

d. losing mass.

\_\_\_\_ 7. Acceleration due to gravity is also called

a. negative velocity.

b. free-fall acceleration.

c. displacement.

d. instantaneous acceleration.

\_\_\_\_ 8. Which statement about the acceleration of an object is correct?

a. The acceleration of an object is directly proportional to the net external force acting on the object and inversely proportional to the mass of the object.

b. The acceleration of an object is directly proportional to the net external force acting on the object and directly proportional to the mass of the object. c. The acceleration of an object is inversely proportional to the net external force acting on the object and inversely proportional to the mass of the object.

d. The acceleration of an object is inversely proportional to the net external force acting on the object and directly proportional to the mass of the object.

\_\_\_\_ 9. Acceleration due to gravity is also called

a. negative velocity.

b. free-fall acceleration.

c. displacement.

d. instantaneous acceleration.

\_\_\_ **10.** According to Newton's second law, when the same force is applied to two objects of different masses,

- a. the object with greater mass will experience a great acceleration, and the object with less mass will experience an even greater acceleration.
- b. the object with greater mass will experience a smaller acceleration, and the object with less mass will experience a greater acceleration.
- c. the object with greater mass will experience a greater acceleration, and the object with less mass will experience a smaller acceleration.

\_\_\_ **11.** A net force of 68 N accelerates a 34 kg scooter across a level parking lot. What is the magnitude of the scooter's acceleration?

- a. 2 m/s
- b. 3.2 m/s
- c. 0.69 m/s
- d. 4.6 m/s

\_\_\_ **12.** The statement by Newton that for every action there is an equal but opposite reaction is which of his laws of motion?

- a. first
- b. third
- c. second
- d. fourth

\_\_\_ **13.** A force of 45 N attached to a spring that is hanging vertically stretches the spring 0.15 m. What is the spring constant?

- a. 300 N/m.
- b. 3000 N/m.
- c. 30 N/m.
- d. 3 N/m

\_\_\_ **14.** When a car's velocity is positive and its acceleration is negative, what is happening to the car's motion?

- a. The car slows down.
- b. The car travels at constant speed.
- c. The car speeds up.
- d. The car remains at rest.

\_\_\_ **15.** When a car's velocity is negative and its acceleration is negative, what is happening to the car's motion?

- a. The car slows down.
- b. The car travels at constant speed.
- c. The car speeds up.
- d. The car remains at rest.

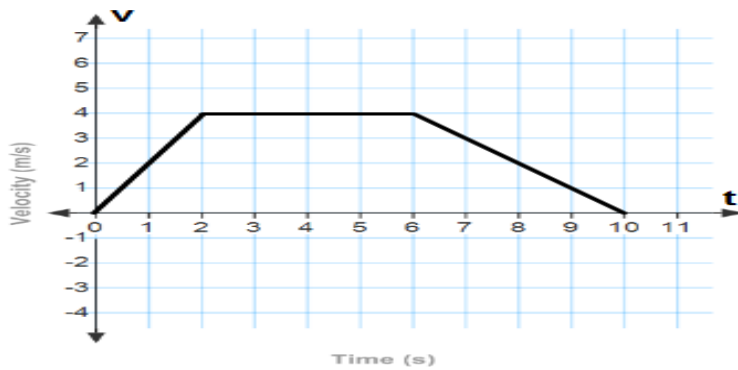
\_\_\_ **16.** A sled weighing  $1.0 \times 10^3$  N is held in place on a frictionless  $20.0^\circ$  slope by a rope attached to a stake at the top. The rope is parallel to the slope. What is the normal force of the slope acting on the sled?

- a. 94 N
- b. 37 N
- c. 47 N
- d. 34 N



**Answer the following questions:**

15. Given the velocity – time graph shown below:



a. Find the acceleration within the following time intervals:

i. t: 0 to 2 sec:

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ii. t: 2 to 6 sec:

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iii. t: 6 to 10 sec:

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b. Object is moving at constant velocity within the following time interval:

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c. Object is speeding up within t:

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d. Object is slowing down within t:

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e. Find the **total displacement** covered throughout this trip.

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**21.** In a game of tug-of-war, a rope is pulled by a force of 182 N to the **right** and by a force of 108 N to the **left**. What is the magnitude and direction of the **net force** on the rope?

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**22.** A wagon having a mass of 91 kg is accelerated across a level road at  $2.0 \text{ m/s}^2$ . What net force acts on the wagon horizontally?

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**23.** A car moving on a straight road increases its speed at a uniform rate from 10 m/s to 20 m/s in 5 s.

a. What is its acceleration.

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b. How far did it go during those 5 s?

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**24.** A pile driver drops from a height of 35 m before landing on a piling. What is the speed of the driver when it hits the piling?

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Good Luck