1 pt For the two numbers $x = 0.43$ and $y = 3.53$, which one of the following has two significant figures?

1. **A**◯ the sum, $x + y$
B◯ the number y
C◯ the ratio, x/y
D◯ the difference, x - y

1 pt If the radius of a planet is larger than that of Earth by a factor of 7.29, how much bigger is the surface area of the planet than Earth's?

2. **A**◯ 21.77 **B**◯ 27.21 **C**◯ 34.01
D◯ 42.52 **E**◯ 53.14 **F**◯ 66.43
G◯ 83.04 **H**◯ 103.80

A position vector has components $x = 36.1$ m and $y = -51.7$ m.

1 pt a) Find the vector's length.
(in `m`*)*

3. **A**◯ 35.647 **B**◯ 47.411 **C**◯ 63.056
D◯ 83.865 **E**◯ 111.540 **F**◯ 148.349
G◯ 197.304 **H**◯ 262.414

1 pt b) Find the vector's angle. Give angle [between -180 degrees and 180 degrees] relative to the positive x-axis.
(in `deg`*)*

4. **A**◯ -41.410 **B**◯ -55.075 **C**◯ -73.250
D◯ -97.422 **E**◯ -129.571 **F**◯ -172.330
G◯ -229.199 **H**◯ -304.835

1 pt When you're driving a car along a straight road, you may be traveling in the positive or negative direction and you may have a positive acceleration or a negative acceleration. Match the following combinations of velocity and acceleration with the list of outcomes.

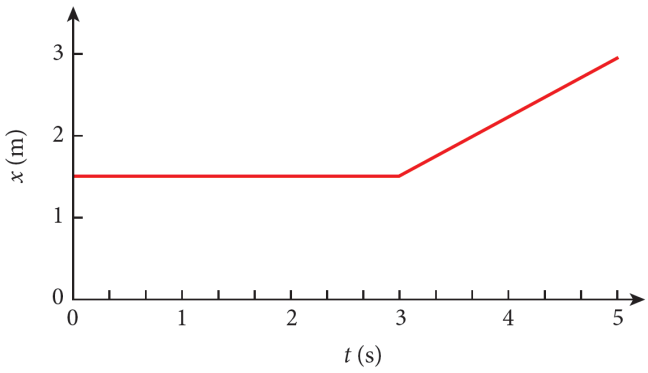
A negative velocity, positive acceleration
B positive velocity, negative acceleration
C positive velocity, positive acceleration
D negative velocity, negative acceleration

▷ speeding up in the negative direction
5 **A**◯ **B**◯ **C**◯ **D**◯

▷ speeding up in the positive direction
6 **A**◯ **B**◯ **C**◯ **D**◯

▷ slowing down in the positive direction
7 **A**◯ **B**◯ **C**◯ **D**◯

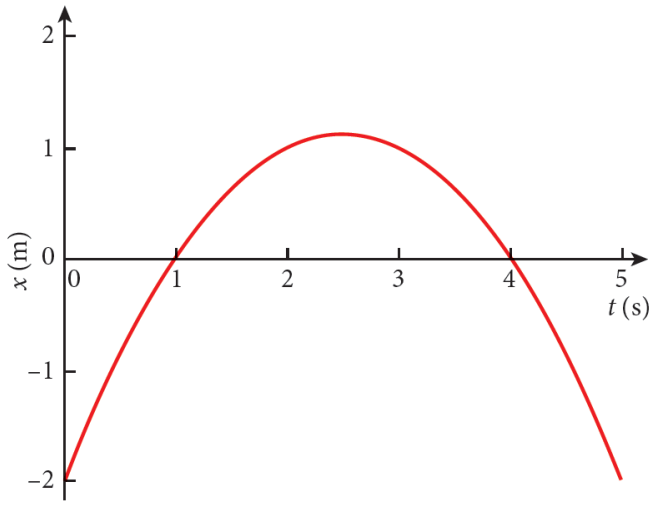
▷ slowing down in the negative direction
8 **A**◯ **B**◯ **C**◯ **D**◯



1 pt

The figure describes the position of an object as a function of time. Which one of the following statements is true?

9. **A**◯ The position of the object is constant.
B◯ The object moves in the positive x-direction from $t = 0$ to $t = 3$ s and then moves in the negative x-direction from $t = 3$ s to $t = 5$ s.
C◯ The object moves in the positive x-direction until $t = 3$ s, and then the object is at rest.
D◯ The object's position is constant until $t = 3$ s, and then the object begins to move in the positive x-direction.
E◯ The velocity of the object is constant.



1 pt

The figure describes the position of an object as a function of time. Which one of the following statements is true at $t = 1$ s?

10. **A**◯ The x-component of the velocity of the object is zero.
B◯ The x-component of the velocity of the object is negative.
C◯ The x-component of the acceleration of the object is zero.
D◯ The x-component of the velocity of the object is positive.

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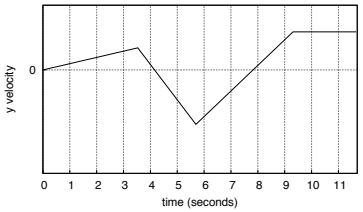
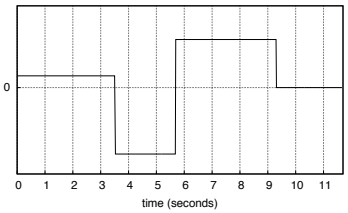
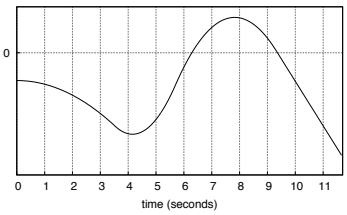
1 pt

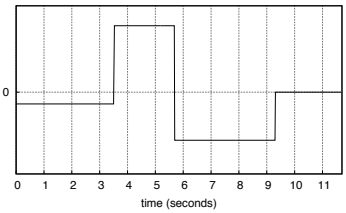
The following is a graph of v_y as a function of time.

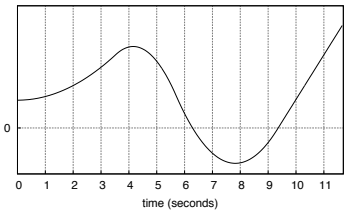


Find the corresponding graph in the list below that could represent $y(t)$..

A


B


C


D


E None of these.

▷ The graph that could represent $y(t)$ is:

11 **A**◯ **B**◯ **C**◯ **D**◯ **E**◯

---

1 pt The position of a particle moving along the x-axis is given by $x = (13.5 + 16.5\ t - 2.13\ t^2)$, where t is in seconds and x is in meters. What is the average velocity during the time interval from $t = 1.00$ s to $t = 3.61$ s?

(in `m/s`*)*

12. **A**◯ 4.607 **B**◯ 6.681 **C**◯ 9.687
D◯ 14.046 **E**◯ 20.367 **F**◯ 29.532
G◯ 42.822 **H**◯ 62.091

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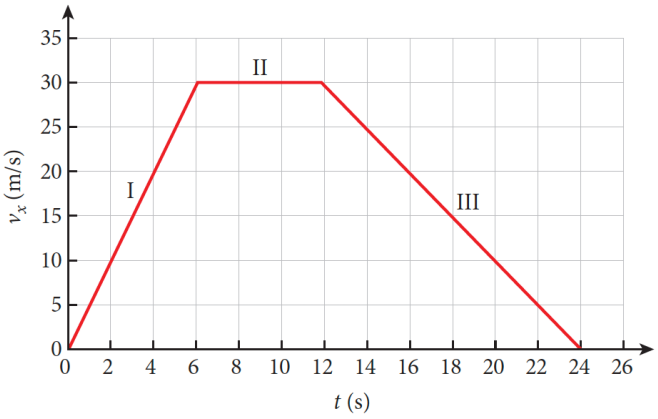
1 pt A car is traveling south at 28.3 m/s. After 10.5 s, its velocity is 24.3 m/s in the same direction. Find the magnitude and direction of the car's average acceleration (a positive result will indicate that the acceleration points to the south, and a negative result will indicate that the acceleration points to the north).

(in `m/s^2`*)*

13. **A**◯ -0.264 **B**◯ -0.298 **C**◯ -0.337 **D**◯ -0.381
E◯ -0.430 **F**◯ -0.486 **G**◯ -0.550 **H**◯ -0.621



A fellow student found in the performance data for his new car the velocity-versus-time graph shown in the figure.

1 pt a) Find the average acceleration of the car during segment I.
(in `m/s^2`*)*

14. **A**◯ 1.049 **B**◯ 1.311 **C**◯ 1.638 **D**◯ 2.048
E◯ 2.560 **F**◯ 3.200 **G**◯ 4.000 **H**◯ 5.000

1 pt b) What is the total distance traveled by the car from t = 0 s to t = 24 s?
(in `m`*)*

15. **A**◯ 2.140×10^2 **B**◯ 3.103×10^2
C◯ 4.500×10^2 **D**◯ 6.525×10^2
E◯ 9.461×10^2 **F**◯ 1.372×10^3
G◯ 1.989×10^3 **H**◯ 2.884×10^3

1 pt Runner 1 is standing still on a straight running track. Runner 2 passes him, running with a constant speed of 6.1 m/s. Just as runner 2 passes him, runner 1 accelerates with a constant acceleration of 1.75 m/s^2. How far down the track does runner 1 catch up with runner 2?
(in `m`*)*

16. **A**◯ 3.16 **B**◯ 4.58 **C**◯ 6.63 **D**◯ 9.62
E◯ 13.95 **F**◯ 20.23 **G**◯ 29.33 **H**◯ 42.53

1 pt A jet touches down on a runway with a speed of 139.4 mph. After 15.3 s, the jet comes to a complete stop. Assuming constant acceleration of the jet, how far down the runway from where it touched down does the jet stand?

(in `m`*)*

17. **A**◯ 152.36 **B**◯ 202.64 **C**◯ 269.51
D◯ 358.44 **E**◯ 476.73 **F**◯ 634.05
G◯ 843.28 **H**◯ 1121.57