

Q1. Using the appropriate number of significant figures, $3.0 \times 4.00 =$

a) 12 b) 12.0 c) 12.00 d) 1×10^1

Q2. How many significant figures are in 2.0010?
a) 1 b) 2 c) 4 d) 5

Q3. Which of the following has the dimensions of acceleration?
 a) x^2/vt b) $2vx/t$ c) $5v^2/x$ d) $\sqrt{2v^2/xt}$

Q4. A bee, initially moving with a velocity of $\vec{v}_0 = 2\hat{x}$ m/s, started to accelerate with a constant acceleration of $\vec{a} = -\hat{y}$ m/s². What is it's velocity after 2 seconds?

a) $2\hat{x} - 2\hat{y}$ m/s b) 0 m/s c) $2\hat{x} + 2\hat{y}$ m/s d) $4\hat{x} - 2\hat{y}$ m/s

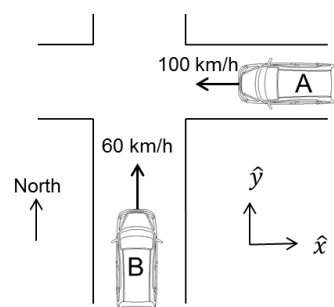
Q5. A boat moves with a constant velocity of $\vec{v} = (3\hat{x} - \hat{y})$ m/s. What is its speed?
a) 9 m/s b) 2 m/s c) 4 m/s d) 3.16 m/s

Q6. The direction angle θ of the vector $\vec{R} = -3\hat{x} - 2\hat{y}$ is:

a) 33.7° b) 146.3° c) 56.3° d) 213.7°

Q7. In the shown figure, car A is moving at 100 km/h west and car B is moving at 60 km/h north. What is the velocity of car A relative to car B?

a) $-100\hat{x} - 60\hat{y}$ km/h	b) $-100\hat{x} + 60\hat{y}$ km/h
c) $100\hat{x} + 60\hat{y}$ km/h	d) $100\hat{x} - 60\hat{y}$ km/h



Q8. To visit a friend, you drive 3 km north, then 3 km east, and then 1 km south. Assuming the north direction is along the positive y -axis, your displacement vector is:

a) $-3\hat{x} + 2\hat{y}$ km b) $-3\hat{x} - 2\hat{y}$ km c) $3\hat{x} + 2\hat{y}$ km d) $3\hat{x} - 2\hat{y}$ km

Q9. A ball is dropped from rest from the top of a building. It reaches the ground after 2 seconds. What is the height of the building?

a) 10 m b) 20 m c) 40 m d) 30 m

Q10. An object is moving in one dimension with a constant acceleration. Its initial velocity is 2 m/s at the position $x_0 = 4$ m. Two seconds later, its position is $x = 5$ m. What is the acceleration of the object?

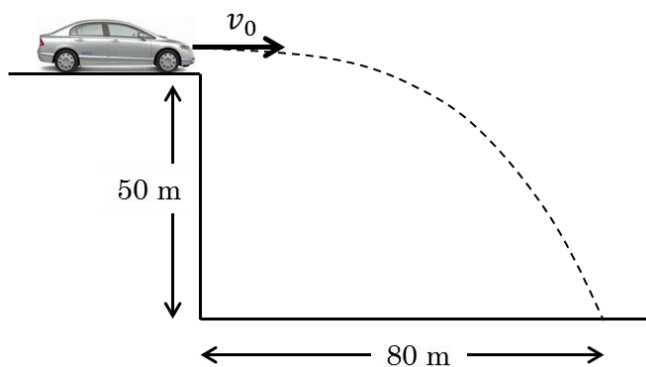
a) 1.5 m/s² b) 5 m/s² c) -1.5 m/s² d) -5 m/s²

- Q11. A man walks 6 km east for 3 hours, then 4 km west for 1 hour. What is his average speed?
a) 2.5 km/h b) 0.5 km/h c) 3 km/h d) 1 km/h
- Q12. A truck slows down from 15 m/s to 5 m/s over a 25 m distance. What is the acceleration of the truck?
a) -5 m/s^2 b) -0.4 m/s^2 c) -8 m/s^2 d) -4 m/s^2
- Q13. An object is thrown vertically upward with an initial speed of 35 m/s. The velocity of the object 5 s later is:
a) 85 m/s down b) 15 m/s up c) 15 m/s down d) 85 m/s up
- Q14. A football is kicked with an initial velocity of 8 m/s at 15° above the horizontal. It lands at the same level from which it was kicked. The horizontal distance the football travels (its range) is:
a) 0.4 m b) 1.7 m c) 6.4 m d) 3.2 m

End of part 1

Part 2: Solve the following two problems in the provided space. **Show all your steps** and include the appropriate units. Use $g = 10 \text{ m/s}^2$.

- Q1. (3 points) A car drives off a 50 m high cliff, horizontally, as shown. It lands 80 m away from the base of the cliff.
- How long is the car in the air (its flight time)?
 - How fast was the car when it left the cliff (its initial velocity)?



- Q2. (3 points) Given the vectors $\vec{A} = 2\hat{x} + \hat{y}$ and $\vec{B} = 3\hat{x} - 2\hat{y}$.
- Draw the vectors \vec{A} , \vec{B} , $\vec{A} - \vec{B}$
 - Calculate the magnitude and the direction of the vector $\vec{A} - \vec{B}$.

