

#7 2D Motion & Relative Motion Post-class

Due: 11:00am on Friday, September 7, 2012

Note: You will receive no credit for late submissions. To learn more, read your instructor's [Grading Policy](#)

Exercise 3.27

An airplane is flying with a velocity of 91.0 m/s at an angle of 19.0° above the horizontal. When the plane is a distance 103 m directly above a dog that is standing on level ground, a suitcase drops out of the luggage compartment.

Part A

How far from the dog will the suitcase land? You can ignore air resistance.

ANSWER:

$$x = 733 \text{ m}$$

All attempts used; correct answer displayed

Exercise 3.3

A web page designer creates an animation in which a dot on a computer screen has a position of $\vec{r} = [4.5 \text{ cm} + (3.0 \text{ cm/s}^2)t^2]\hat{i} + (5.5 \text{ cm/s})t\hat{j}$.

Part A

Find the average velocity of the dot between $t = 0$ and $t = 2.0 \text{ s}$.

Give your answer as a pair of components separated by a comma. For example, if you think the x component is 3 and the y component is 4, then you should enter 3,4. Express your answer using two significant figures.

ANSWER:

$$\vec{v}_{ave} = 6.0, 5.5 \text{ cm/s}$$

Correct

Part B

Find the instantaneous velocity at $t = 0$.

Give your answer as a pair of components separated by a comma. For example, if you think the x component is 3 and the y component is 4, then you should enter 3, 4. Express your answer using two significant figures.

ANSWER:

$$\vec{v} = 0, 5.5 \text{ cm/s}$$

Answer Requested

Part C

Find the instantaneous velocity at $t = 1.0 \text{ s}$.

Give your answer as a pair of components separated by a comma. For example, if you think the x component is 3 and the y component is 4, then you should enter 3,4. Express your answer using two significant figures.

ANSWER:

$$\vec{v} = 6.0, 5.5 \text{ cm/s}$$

All attempts used; correct answer displayed

Part D

Find the instantaneous velocity at $t = 2.0 \text{ s}$.

Give your answer as a pair of components separated by a comma. For example, if you think the x component is 3 and the y component is 4, then you should enter 3,4. Express your answer using two significant figures.

ANSWER:

$$\vec{v} = 12, 5.5 \text{ cm/s}$$

All attempts used; correct answer displayed

Exercise 3.6

A dog running in an open field has components of velocity $v_x = 3.5 \text{ m/s}$ and $v_y = -1.5 \text{ m/s}$ at time $t_1 = 10.6 \text{ s}$. For the time interval from $t_1 = 10.6 \text{ s}$ to $t_2 = 22.5 \text{ s}$, the average acceleration of the dog has magnitude 0.40 m/s^2 and direction 35.0° measured from the $+x$ -axis toward the $+y$ -axis.

Part A

At time $t_2 = 22.5\text{ s}$, what are the x- and y-components of the dog's velocity?

Express your answer using two significant figures.

ANSWER:

$$v_x = 7.4 \text{ m/s}$$

All attempts used; correct answer displayed

Part B

Express your answer using two significant figures.

ANSWER:

$$v_y = 1.2 \text{ m/s}$$

All attempts used; correct answer displayed

Part C

What is the magnitude of the dog's velocity?

Express your answer using two significant figures.

ANSWER:

$$v = 7.5 \text{ m/s}$$

All attempts used; correct answer displayed

Part D

What is the direction of the dog's velocity (measured from the $+x$ -axis toward the $+y$ -axis)?

Express your answer using two significant figures.

ANSWER:

$$\theta = 9.2^\circ$$

All attempts used; correct answer displayed

Exercise 3.39

A canoe has a velocity of 0.41 m/s southeast relative to the earth. The canoe is on a river that is flowing 0.53 m/s east relative to the earth.

Part A

Find the magnitude of the velocity of the canoe relative to the river.

Express your answer using two significant figures.

ANSWER:

$$v = 0.38 \text{ m/s}$$

Answer Requested

Part B

Find the direction of the velocity of the canoe relative to the river.

Express your answer as an angle measured south of west. Express your answer using two significant figures.

ANSWER:

$\theta = 50^\circ$ south of west

Answer Requested

Score Summary:

Your score on this assignment is 0%.

You received 0 out of a possible total of 40 points.