Week 4 Problem Set (5337751)

Question 1 2 3 4 5 6 7 8 9 10 11 12 13 14

1. Question Details OSColPhys1 3.P.007.WA. [2439421]

The x component of vector $\vec{R}$ is $R_x = -22.2$ units and its y component is $R_y = 27.8$ units. What are its magnitude and direction? Give the direction as an angle measured counterclockwise from the $+x$ direction.

magnitude [ ] 35.6 units

direction [ ] 129 ° counterclockwise from the $+x$-axis

Supporting Materials

Physical Constants

2. Question Details OSColPhys1 3.P.005.WA. [2439390]

If an airplane travels 35.0° north of east for 187 km, how far east and how far north did it travel? In other words, what are the magnitudes of the east component and north component of the plane's displacement?

(a) east component

[ ] 153 km

(b) north component

[ ] 107 km

Supporting Materials

Physical Constants

3. Question Details OSColPhys1 3.P.002.WA. [2439412]

A cheetah is running at a speed of 18.9 m/s in a direction of 35° north of west. Find the components of the cheetah's velocity along the following directions.

(a) the velocity component due north

[ ] 10.8 m/s

(b) the velocity component due west

[ ] 15.5 m/s

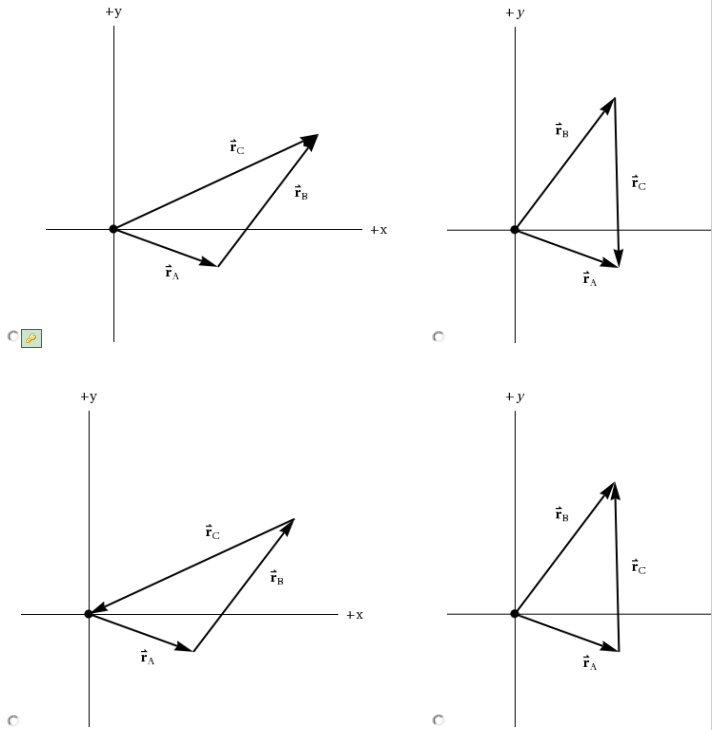
Supporting Materials

Physical Constants

4. Question Details OSColPhys1 3.P.020.WA. [2439403]

Two position vectors lie in a plane. The first, vector $\vec{r}_A$, points at an angle of 20° below the positive x-axis and has a magnitude of 46.5 m. The second, vector $\vec{r}_B$, points at an angle of 51.5° above the positive x-axis and has a magnitude of 75 m.

(a) Choose the diagram below that is correct a graphical representation of $\vec{r}_A + \vec{r}_B$



(b) What is the magnitude and direction of vector $\vec{r}_C$? Give the direction as an angle measured counterclockwise from the positive x-axis?

magnitude [ ] 100 m

direction [ ] 25.3 ° (counterclockwise from the $+x$-axis)

Supporting Materials

Physical Constants

5. Question Details OSColPhys1 3.P.019.WA. [2439393]

A child walking in a field makes three consecutive displacements. The child first moves 5.00 m westward, then 10.5 m northward. Finally, the child moves back to starting point of the first displacement. What is the magnitude and direction of the child's third displacement? Give the direction as an angle south of east.

magnitude [ ] 11.6 m

direction [ ] 64.5 ° south of east

Supporting Materials

Physical Constants

6. Question Details OSColPhys1 3.P.023.WA. [2439402]

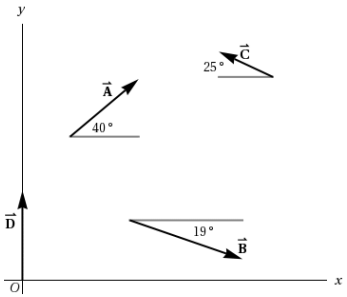
The figure below shows four position vectors, $\vec{A}$, $\vec{B}$, $\vec{C}$, and $\vec{D}$. Their directions are given in the figure, and their magnitudes are the following:

$A = 9$ m
$B = 12$ m
$C = 6$ m
$D = 9$ m.

If the vector $\vec{R} = \vec{A} + \vec{B} + \vec{C} + \vec{D}$, what are the x and y components of $\vec{R}$?

R_x = [ ] 12.8 m

R_y = [ ] 13.4 m



Supporting Materials

Physical Constants

7. Question Details OSColPhys1 3.P.044.WA. [2439404]

A seagull flying horizontally over the ocean at a constant speed of 3.10 m/s carries a small fish in its mouth. It accidentally lets go of the fish, and 2.30 s after letting go the fish lands in the ocean.

(a) Just before reaching the ocean, what is the horizontal component of the fish's velocity? Ignore air resistance. Assume the bird is initially traveling in the positive x direction. (Indicate the direction with the sign of your answer.)

[ ] 3.1 m/s

(b) Just before reaching the ocean, what is the vertical component of the fish's velocity? Ignore air resistance. Assume upward is the positive y direction and downward is the negative y direction. (Indicate the direction with the sign of your answer.)

[ ] -22.5 m/s

(c) If the seagull's initial speed were increased, which of the following regarding the fish's velocity upon reaching the ocean would be true? (Select all that apply.)

- ☐ The horizontal component of the fish's velocity would increase.
- ☐ The horizontal component of the fish's velocity would decrease.
- ☐ The horizontal component of the fish's velocity would stay the same.
- ☐ The vertical component of the fish's velocity would increase.
- ☐ The vertical component of the fish's velocity would decrease.
- ☐ The vertical component of the fish's velocity would stay the same.

Supporting Materials

Physical Constants

8. Question Details OSColPhys1 3.P.040.WA. [2439407]

An Olympic diver is on a diving platform 9.60 m above the water. To start her dive, she runs off of the platform with a speed of 1.25 m/s in the horizontal direction. What is the diver's speed just before she enters the water?

[ ] 13.8 m/s

Supporting Materials

Physical Constants

9. Question Details OSColPhys1 3.P.043.WA. [2439414]

The acceleration due to gravity at the surface of a planet depends on the planet's mass and size; therefore other planets will have accelerations due to gravity different from 9.8 m/s^2. Imagine an astronaut stands on an alien planet, which has no atmosphere, and throws a rock with a speed of 6.85 m/s in the horizontal direction, releasing it at a height of 1.40 m above the surface of the planet. The rock hits the surface a horizontal distance of 9.20 m from the astronaut. Find the magnitude of the acceleration due to gravity on this alien planet.

[ ] 1.55 m/s^2

Supporting Materials

Physical Constants

10. Question Details OSColPhys1 3.P.039.WA. [2439396]

A baseball pitcher throws a ball horizontally at a speed of 42.2 m/s. A catcher is 18.4 m away from the pitcher. Find the magnitude of the vertical distance that the ball drops as it moves from the pitcher to the catcher. Ignore air resistance.

[ ] 0.932 m

Supporting Materials

Physical Constants

11. Question Details OSColPhys1 3.P.042.WA. [2439433]

A tennis player serves a tennis ball such that it is moving horizontally when it leaves the racquet. When the ball travels a horizontal distance of 11 m, it has dropped 47 cm from its original height when it left the racquet. What was the initial speed of the tennis ball? (Neglect air resistance.)

[ ] 35.5 m/s

Supporting Materials

Physical Constants

12. Question Details OSColPhys1 3.4.046. [2153215]

A basketball player is running at 5.30 m/s directly toward the basket when he jumps into the air to dunk the ball. He maintains his horizontal velocity.

(a) What vertical velocity does he need to rise 0.600 meters above the floor?

[ ] 3.43 m/s

(b) How far from the basket (measured in the horizontal direction) must he start his jump to reach his maximum height at the same time as he reaches the basket?

[ ] 1.85 m

13. Question Details OSColPhys1 3.P.037.WA. [2439394]

A football is kicked from ground level with an initial velocity of 20.6 m/s at angle of 51.5° above the horizontal. How long is the football in the air before it hits the ground? Ignore air resistance.

[ ] 3.29 s

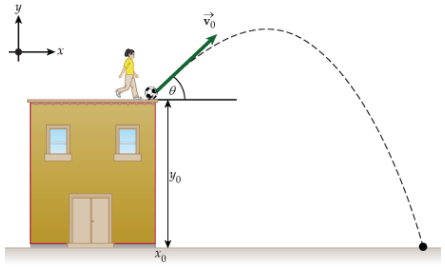
Supporting Materials

Physical Constants

14. Question Details OSColPhys1 3.P.036.Tutorial.WA. [2440539]

You are walking around your neighborhood and you see a child on top of a roof of a building kick a soccer ball. The soccer ball is kicked at 35° from the edge of the building with an initial velocity of 17 m/s and lands 59 meters away from the wall. How tall is the building that the child is standing on?

[ ] 46.6 m



Supporting Materials

Physical Constants

Assignment Details

Name (AID): **Week 4 Problem Set (5337751)**
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Code:
Locked: **No**
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