HW2 - due 6 pm Day 5 (Fri. Aug. 1) (5964519)

Question 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

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

The x component of vector $\vec{R}$ is $R_x = -27.0$ units and its y component is $R_y = 24.8$ units. What are its magnitude and direction? Give the direction as an angle measured counterclockwise from the $+x$ direction.

magnitude [ ] 36.7 units

direction [ ] 137 ° counterclockwise from the $+x$-axis

Supporting Materials

Physical Constants

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

If an airplane travels 41.0° north of east for 205 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

[ ] 155 km

(b) north component

[ ] 134 km

Supporting Materials

Physical Constants

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

A cheetah is running at a speed of 20.4 m/s in a direction of 36° north of west. Find the components of the cheetah's velocity along the following directions.

(a) the velocity component due north

[ ] 12 m/s

(b) the velocity component due west

[ ] 16.5 m/s

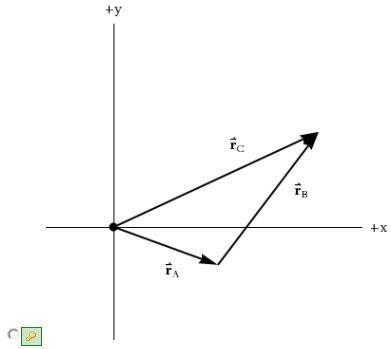
Supporting Materials

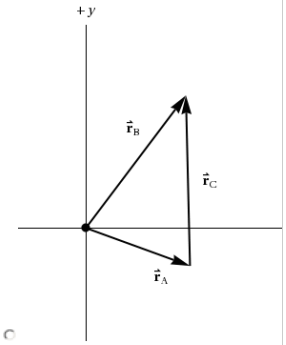
Physical Constants

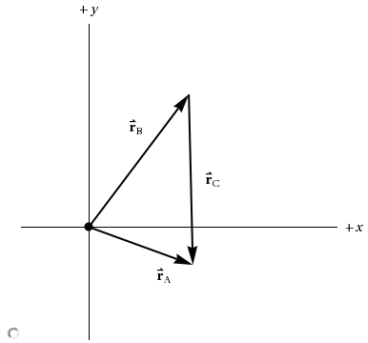
4. Question Details OSColPhys1 3.P.020.WA. [2439403]

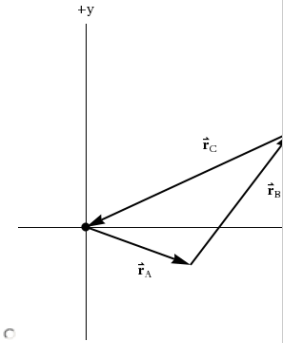
Two position vectors lie in a plane. The first, vector $\vec{r}_A$, points at an angle of 20° below the positive x-axis and has a magnitude of 59.0 m. The second, vector $\vec{r}_B$, points at an angle of 54.0° above the positive x-axis and has a magnitude of 75 m.

(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 [ ] 107 m

direction [ ] 22.1 ° (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 4.95 m westward, then 12.1 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 [ ] 13.1 m

direction [ ] 67.8 ° south of east

Supporting Materials

Physical Constants

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

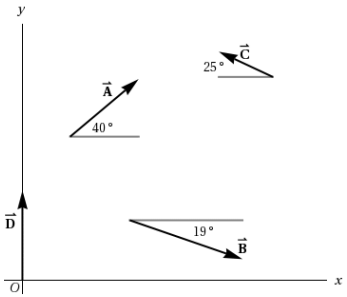
The figure below shows four position vectors, $\vec{A}$, $\vec{B}$, $\vec{C}$, and $\vec{D}$. Their directions are given in the figure, and their magnitudes are the following:

A = 69 m
B = 92 m
C = 46 m
D = 69 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 = [ ] 98.2 m

R_y = [ ] 103 m



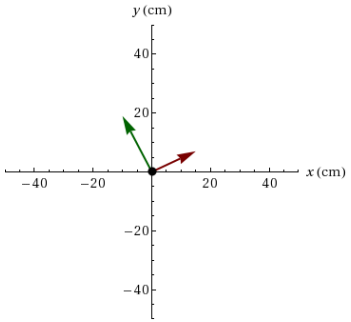
Supporting Materials

Physical Constants

7. Question Details OSColPhys1 3.P.027.WA. [2439388]

Two position vectors, $\vec{A}$ and $\vec{B}$, are shown in the diagram below. The green arrow represents vector $\vec{A}$ while the red one represents $\vec{B}$. The components of the vectors are as follows:

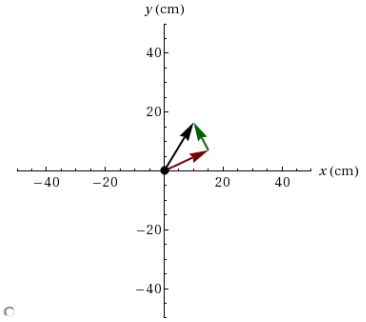
A_x = −10 cm, A_y = 19 cm
B_x = 15 cm, B_y = 7 cm.

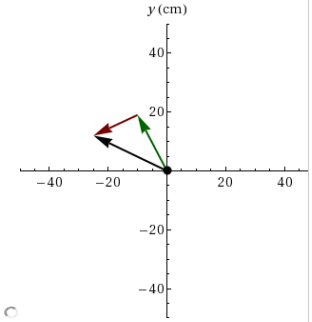


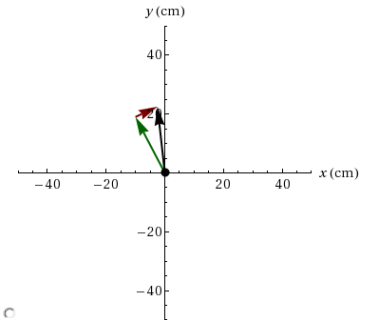
For each of the given expressions, calculate the magnitude of the resultant vector, and select the diagram that is the best graphical (tail-to-head method) representation of the vectors and the resultant.

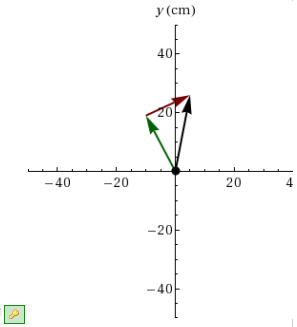
(a) $\vec{C} = \vec{A} + \vec{B}$

[ ] 26.5 cm



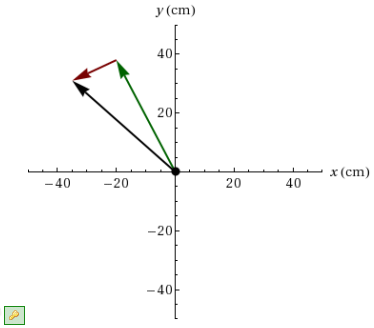


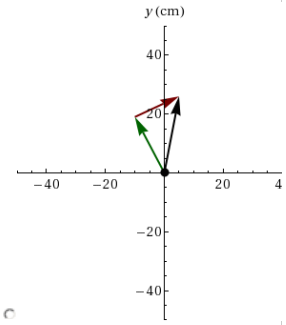


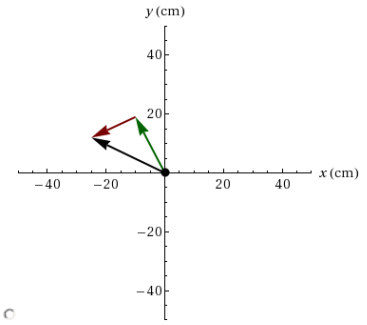


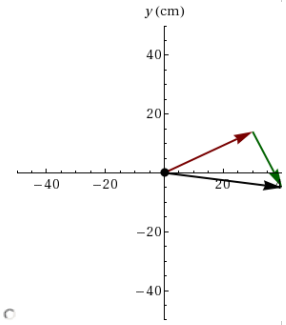
(b) $\vec{D} = 2\vec{A} - \vec{B}$

46.8 cm









Supporting Materials

Physical Constants

8. Question Details OSColPhys1 3.P.014.WA. [2439397]

While in a park, you walk west for 52 m, then you walk 28.2° north of west for 41 m, and finally you walk due north for 25 m. Find the components of your final displacement, from your initial to final point, along the north and west directions.

(a) displacement component due north

44.4 m

(b) displacement component due west

88.1 m

Supporting Materials

Physical Constants

9. Question Details OSColPhys1 3.P.032.WA. [2439410]

A computer model displays the motion of a particle on a coordinate system in real time. At time $t = 0$, the particle is at the origin of the coordinate system and has velocity components $v_x = 0$ and $v_y = 6.4$ m/s. The particle has acceleration components of $a_x = -4.8$ m/s^2 and $a_y = 0$.

(a) What are the x and y positions of the particle at $t = 5.5$ s?

$x =$ -72.6 m

$y =$ 35.2 m

(b) What are velocity components of the particle at $t = 5.5$ s?

$v_x =$ -26.4 m/s

$v_y =$ 6.4 m/s

(c) How does the speed of the particle change from $t = 0$ to $t = 5.5$ s?

- The particle's speed remains constant.
- The particle's speed increases and then decreases with time.
- The particle's speed increases with time.
- The particle's speed decreases with time.

Supporting Materials

Physical Constants

10. Question Details OSColPhys1 3.P.033.WA. [2439434]

A satellite in outer space is moving at a constant velocity of 21.0 m/s in the +*y* direction when one of its onboard thruster turns on, causing an acceleration of 0.350 m/s^2 in the +*x* direction. The acceleration lasts for 44.0 s, at which point the thruster turns off.

(a) What is the magnitude of the satellite's velocity when the thruster turns off?

[ ] 26 m/s

(b) What is the direction of the satellite's velocity when the thruster turns off? Give your answer as an angle measured counterclockwise from the +*x*-axis.

[ ] 53.7 ° counterclockwise from the +*x*-axis

Supporting Materials

Physical Constants

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

A seagull flying horizontally over the ocean at a constant speed of 2.60 m/s carries a small fish in its mouth. It accidentally lets go of the fish, and 2.10 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.)

[ ] 2.6 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.)

[ ] -20.6 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.

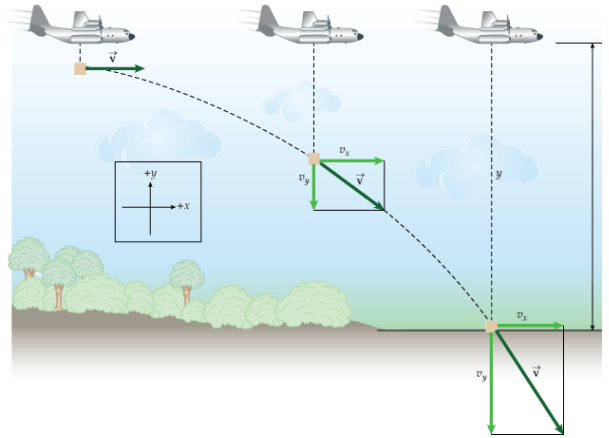
Supporting Materials

Physical Constants

12. Question Details OSColPhys1 3.P.038.WA. [2439435]

A cargo plane is moving with a horizontal velocity of v_x = +226 m/s at a height of y = 940 m above level ground as shown in the figure below when it releases a package. Ignoring air resistance, how much time will it take the package to reach the ground? (Express your answer to the nearest tenth of a second.)

[ ] 13.9 s



Supporting Materials

Physical Constants

13. Question Details OSColPhys1 3.P.041.WA. [2439430]

While standing on the roof of a building, a child tosses a tennis ball with an initial speed of 16 m/s at an angle of 10° below the horizontal. The ball lands on the ground 3.0 s later. How tall is the building?

[ ] 52.4 m

Supporting Materials

Physical Constants

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

An Olympic diver is on a diving platform 5.90 m above the water. To start her dive, she runs off of the platform with a speed of 1.29 m/s in the horizontal direction. What is the diver's speed just before she enters the water?

[ ] 10.8 m/s

Supporting Materials

Physical Constants

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

A football is kicked from ground level with an initial velocity of 22.8 m/s at angle of 34.5° above the horizontal. How long is the football in the air before it hits the ground? Ignore air resistance.

[ ] 2.64 s

Supporting Materials

Physical Constants

16. Question Details OSColPhys1 3.P.046.WA. [2439415]

The place kicker on a football team kicks a ball from ground level with an initial speed of 8.80 m/s at an angle of 35.0° above the horizontal. How long is the ball in the air before it lands on the ground again? You may neglect air resistance.

[ ] 1.03 s

Supporting Materials

Physical Constants

17. Question Details OSColPhys1 3.P.053.WA. [2439385]

A stunt pilot is attempting to drop a water balloon from a moving airplane onto a target on the ground. The plane moves at a speed of 82.4 m/s and a 47° above the horizontal when the balloon is released. At the point of release, the plane is at an altitude of 900 m.

(a) How far horizontally, measured from a point directly below the plane's initial position, will the balloon travel before striking the ground?

[ ] 1180 m

(b) At the point just before balloon strikes the ground, what angle does its velocity make with the horizontal? Give your answer as an angle measured *below* the horizontal.

[ ] 68.9 °

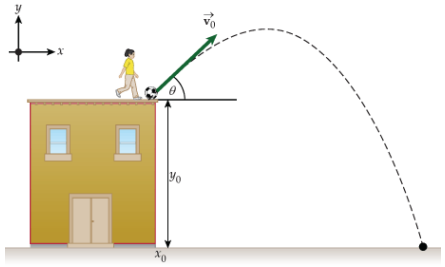
Supporting Materials

Physical Constants

18. 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 45° from the edge of the building with an initial velocity of 21 m/s and lands 57 meters away from the wall. How tall is the building that the child is standing on?

[ ] 15.2 m



Supporting Materials

Physical Constants

Assignment Details

Name (AID): **HW2 - due 6 pm Day 5 (Fri. Aug. 1) (5964519)**
Submissions Allowed: **5**
Category: **Homework**
Code:
Locked: **No**
Author: **Chowdary, Krishna (** chowdark@evergreen.edu **)**
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