Physics Problem Set 6 - Week 7 (5743117)

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

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

The x component of vector $\vec{R}$ is $R_x = -23.2$ units and its y component is $R_y = 29.2$ units. What are its magnitude and direction? Give the direction as an angle measured counterclockwise from the +x direction.

magnitude   [37.3] units

direction   [128] ° counterclockwise from the +x-axis

Supporting Materials

Physical Constants

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

If an airplane travels 21.0° north of east for 260 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
[243] km

(b) north component
[93.2] km

Supporting Materials

Physical Constants

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

A cheetah is running at a speed of 17.7 m/s in a direction of 48° north of west. Find the components of the cheetah's velocity along the following directions.

(a) the velocity component due north
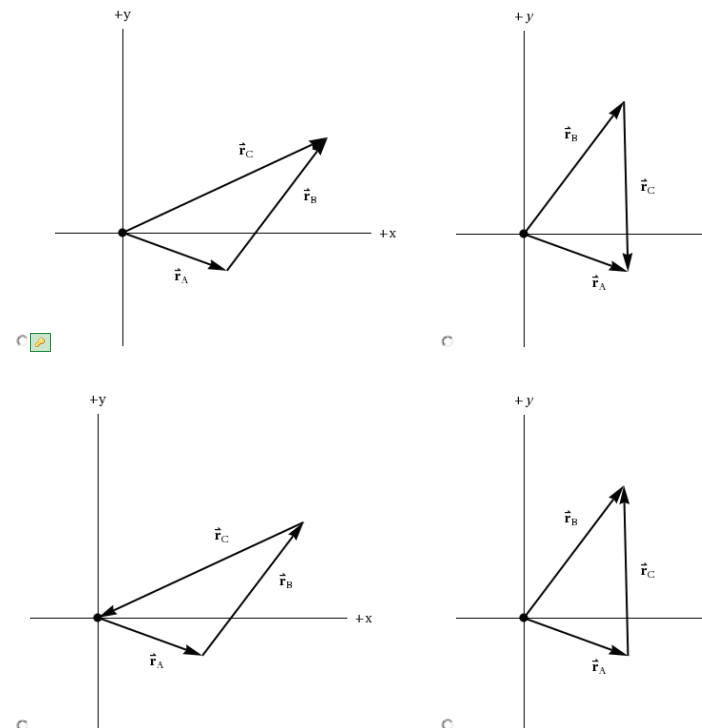[13.2] m/s

(b) the velocity component due west
[11.8] 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 51.0 m. The second, vector $\vec{r}_B$, points at an angle of 59.5° 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   [98.1] m
direction   [28.8] ° (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 6.20 m westward, then 12.7 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   [   ]   🖉   14.1   m

direction   [   ]   🖉   64   ° 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:

$A = 42$ m
$B = 56$ m
$C = 28$ m
$D = 42$ m.

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

$R_x =$ [   ]   🖉   59.7   m

$R_y =$ [   ]   🖉   62.6   m

Supporting Materials

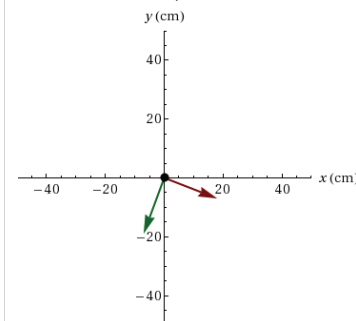Physical Constants

---

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:
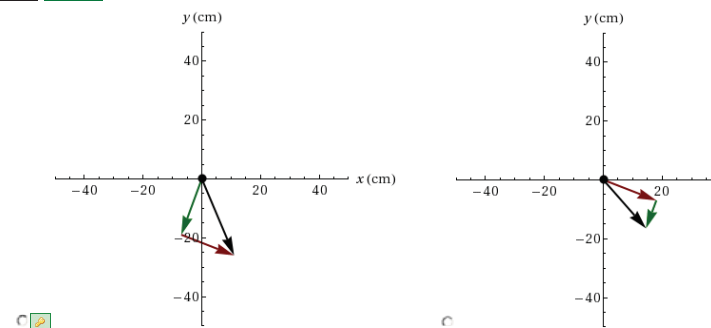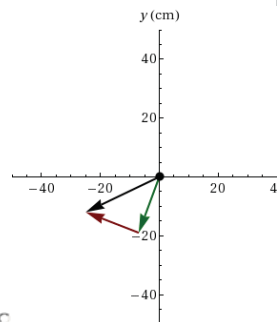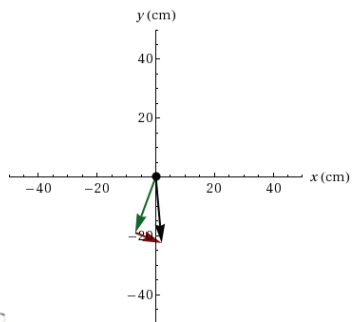
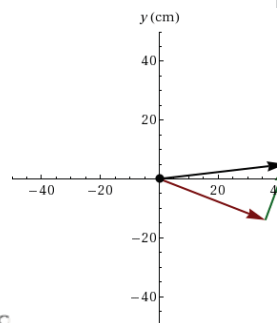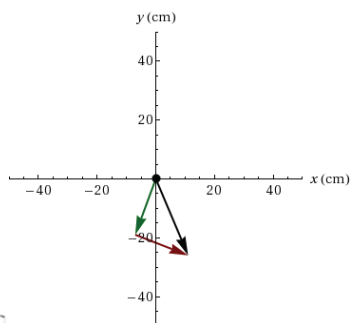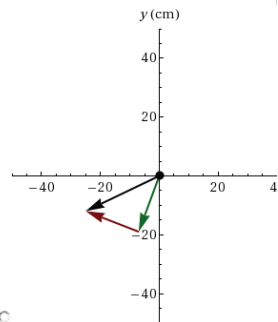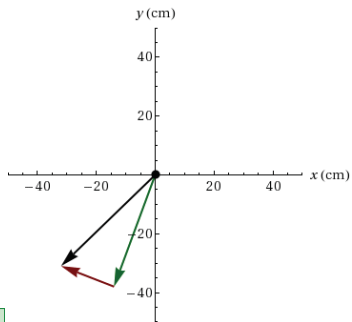$A_x = -7$ cm, $A_y = -19$ cm
$B_x = 18$ cm, $B_y = -7$ cm.

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

[   ]   🖉   28.2   cm

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

[ ] 44.6 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 33.1° 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

[ ] 47.4 m

(b) displacement component due west

[ ] 86.3 m

Supporting Materials

Physical Constants

9.   Question Details   OSColPhys1 3.3.020. [2153316]

A new landowner has a triangular piece of flat land she wishes to fence. Starting at the west corner, she measures the first side to be 80 m long and the next to be 105 m -- these sides are represented as displacement vectors **A** and **B** in Figure 3.26, where θ_1=23°, and θ_2=12°. She then correctly calculates the length and orientation of the third side **C**. What is her result?

[ ] 88.3 m   [ ] 54.1 ° south of west
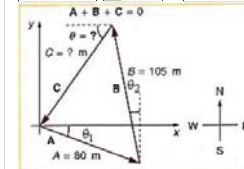

Figure 3.26.

10.   Question Details   OSColPhys1 4.P.027.Tutorial.WA. [2707379]

A 68-kg man stands on a bathroom scale inside an elevator.

(a) The elevator accelerates upward from rest at a rate of 1.15 m/s^2 for 1.50 s. What does the scale read during this 1.50 s interval?

[ ] 745 N

(b) The elevator continues upward at constant velocity for 8.50 s. What does the scale read now?

[ ] 666 N

(c) While still moving upward, the elevator's speed decreases at a rate of 0.400 m/s^2 for 3.00 s. What is the scale reading during this time?

[ ] 639 N

Supporting Materials

Physical Constants

11.   Question Details   OSColPhys1 4.P.029.Tutorial.WA. [2707258]

A contestant in a winter games event pushes a 50.0-kg rock across a frozen lake with a force of 25 N at 26° below the horizontal as shown in Figure (a) below, and it moves with an acceleration of 0.45 m/s² to the right.

(a) What is the normal force exerted by the lake surface on the rock?

[   ]   501   N

(b) Instead of pushing on the rock, the contestant now pulls it with a rope over his shoulder at the same angle above the horizontal as in part (a). See Figure (b) above. Now what is the normal force exerted by the lake surface on the rock?
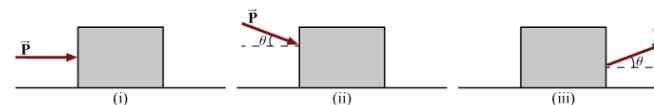
[   ]   479   N

Supporting Materials

Physical Constants

---

12.   Question Details   OSColPhys1 4.P.032.WA. [2707299]

The three diagrams below show a block of mass m being pulled or pushed at constant velocity along a table with a force $\vec{P}$. Assume the surfaces to be frictionless.

(i)   (ii)   (iii)

(a) What is the magnitude of the normal force in each case? Use the following as necessary: g, P, and θ.

case (i) $N =$ mg

case (ii) $N =$ $mg + P\sin(\theta)$

case (iii) $N =$ $mg - P\sin(\theta)$

(b) How would your answer to part (a) change if, all else being the same, the object moved with constant acceleration?

○   The normal force will increase.

○   The normal force will decrease.
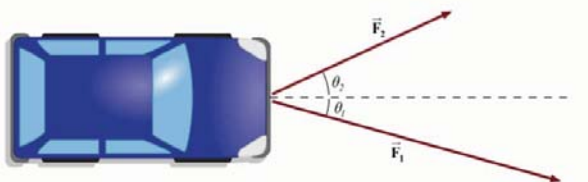
○   The normal force will remain the same.

Supporting Materials

Physical Constants

13.   Question Details   OSColPhys1 4.P.035.WA. [2707414]

Tom enlists the help of his friend John to move his car. They apply forces to the car as shown in the diagram. Here $F_1 = 431$ N and $F_2 = 340$ N and friction is negligible. In the diagram below, the mass of the car = 3500 kg, $\theta_1 = -25°$ and $\theta_2 = 12°$. (Assume the car faces the positive x-axis before the forces are applied.)

(a) Find the resultant force exerted on the car.

magnitude   [732] N

direction   [-8.76] ° (counterclockwise from the +x-axis)

(b) What is the acceleration of the car?

magnitude   [0.209] N

direction   [-8.76] ° (counterclockwise from the +x-axis)

Supporting Materials

Physical Constants

14.   Question Details   OSColPhys1 4.P.037.Tutorial.WA. [2707389]

The figure below shows Superhero hanging motionless from a rope, with Trusty Sidekick hanging below him. Superhero's mass is 87.0 kg, while Trusty Sidekick's is 52.5 kg, and the mass of the rope is negligible.

(a) Find the tension in the rope at a point between Superhero and Trusty Sidekick.

[515] N

(b) Find the tension in the rope at a point above Superhero.

[1370] N

Supporting Materials

Physical Constants

15.   Question Details   OSColPhys1 4.P.038.WA. [2707338]

Consider the following figure. (Let m_1 be the mass of the child, and m_2 be the mass of the scale.)

(a) Which of the following diagrams correctly represents the free body diagram for the child?

Which of the following diagrams correctly represents the free body diagram for the child plus scale?

(b) What is the mass of the child and basket if a scale reading of 104 N is observed?

[____] 🔑 10.6 kg

(c) What is the tension T_1 in the cord attaching the child to the scale? (Enter the magnitude only.)

[____] 🔑 104 N

(d) What is the tension T_2 in the cord attaching the scale to the ceiling, if the scale has a mass of 0.800 kg? (Enter the magnitude only.)

[____] 🔑 112 N

Supporting Materials

Physical Constants

16.   Question Details   OSColPhys1 4.P.044.WA. [2707297]

A 17.6-kg traffic light is suspended from two cables as shown in the figure below. Find the tension in each cable.

left cable [   ] ✏️ 149   N
right cable [   ] ✏️ 86.2 N

Supporting Materials

Physical Constants

Assignment Details

Name (AID): **Physics Problem Set 6 - Week 7 (5743117)**
Submissions Allowed: **5**
Category: **Homework**
Code:
Locked: **No**
Author: **Chowdary, Krishna (** chowdark@evergreen.edu **)**
Last Saved: **May 12, 2014 01:25 AM PDT**
Permission: **Protected**
Randomization: **Person**
Which graded: **Last**

Feedback Settings
Before due date
Question Score
Assignment Score
Publish Essay Scores
Question Part Score
Mark
Add Practice Button
Help/Hints
Response
Save Work
After due date
Question Score
Assignment Score
Publish Essay Scores
Key
Question Part Score
Solution
Mark
Add Practice Button
Help/Hints
Response