HW due 1/17 (extended to 1/24 due to drop/add)

Due: 11:59pm on Sunday, January 24, 2016

You will receive no credit for items you complete after the assignment is due. Grading Policy

Exercise 1.6

A square field measuring 100.0 m by 100.0 m has an area of 1.00 hectare. An acre has an area of $43,600~{
m ft}^2$.

Part A

If a country lot has an area of 12.0 acres, what is the area in hectares?

ANSWER:

4.86 hectares

Correct

Exercise 1.10

The following conversions occur frequently in physics and are very useful.

Part A

Use 1 mi = 5280 ft and 1 h = 3600 s to convert 60 mph to units of ft/s.

Express your answer using two significant figures.

ANSWER:

 $88 ext{ ft/s}$

Correct

Part B

The acceleration of a freely falling object is 32 ft/s^2 . Use 1~ft=30.48~cm to express this acceleration in units of m/s^2 .

Express your answer using two significant figures.

ANSWER:

9.8
$$m/s^2$$

Correct

Part C

The density of water is 1.0 $g/cm^3\,$. Convert this density to units of $kg/m^3\,.$

Express your answer using two significant figures.

ANSWER:

$$1000 ext{ kg/m}^3$$

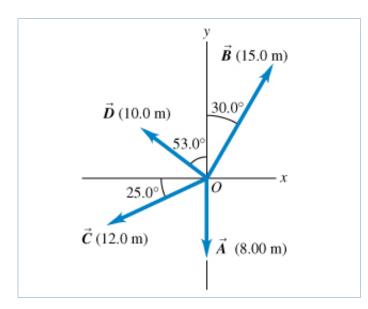
Correct

Exercise 1.24

Part A

For the vectors \vec{A} and \vec{B} in the figure , use a scale drawing to find the magnitude of the vector sum $\vec{A}+\vec{B}$.

Express your answer using two significant figures.



ANSWER:

9.0 m

Part B

Find the direction of the vector sum $\vec{A} + \vec{B}$.

Express your answer using two significant figures.

ANSWER:

34 $^{\circ}$ counterclockwise from +x-axis

Correct

Part C

Find the magnitude of the vector difference $\vec{A}-\vec{B}$.

Express your answer using two significant figures.

ANSWER:

22 m

Correct

Part D

Find the direction of the vector difference $\vec{A}-\vec{B}$.

Express your answer using three significant figures.

ANSWER:

250 $^{\circ}$ counterclockwise from +x-axis

Correct

Part E

Use your answers to find the magnitude of $-\vec{A} - \vec{B}$.

Express your answer using two significant figures.

ANSWER:

9.0 m

Correct

Part F

Find the direction of $-\vec{A}-\vec{B}_{\cdot}$

Express your answer using three significant figures.

ANSWER:

214 $^{\circ}$ counterclockwise from +x-axis

Correct

Part G

Find the magnitude of $\vec{B}-\vec{A}_{\cdot}$

Express your answer using two significant figures.

ANSWER:

22 m

Correct

Part H

Find the direction of $\vec{B}-\vec{A}$.

Express your answer using two significant figures.

ANSWER:

70 $^{\circ}$ counterclockwise from +x-axis

Exercise 1.28

Let the angle θ be the angle that the vector \vec{A} makes with the +x-axis, measured counterclockwise from that axis. Find the angle θ for a vector that has the following components.

Part A

$$A_x=$$
 1.80 ${
m m}$, $A_y=$ -0.500 ${
m m}$

ANSWER:

344

Correct

Part B

$$A_x=$$
 3.60 ${
m m}$, $A_y=$ 2.00 ${
m m}$

ANSWER:

29.1 °

Correct

Part C

$$A_x=$$
 -3.00 m , $A_y=$ 3.40 m

ANSWER:

131 °

Correct

Part D

$$A_x=$$
 -2.90 ${
m m}$, $A_y=$ -4.40 ${
m m}$

ANSWER:

237 °

Correct

Exercise 1.40

You are given two vectors $\vec{A}=-3.00\hat{\iota}+7.00\hat{j}$ and $\vec{B}=8.00\hat{\iota}+2.00\hat{j}$. Let the counterclockwise angles be positive.

Part A

What angle $heta_A$, where $0^\circ \leq heta_A < 360^\circ$, does $ec{A}$ make with the +x-axis?

ANSWER:

$$\theta_A$$
 = 113 $^{\circ}$

Correct

Part B

What angle $heta_B$, where $0^\circ \leq heta_B < 360^\circ$, does $ec{B}$ make with the +x-axis?

ANSWER:

$$\theta_B$$
 = 14.0 $^{\circ}$

Correct

Part C

Vector \vec{C} is the sum of \vec{A} and \vec{B} , so $\vec{C}=\vec{A}+\vec{B}$. What angle θ_C , where $0^\circ \le \theta_C < 360^\circ$, does \vec{C} make with the +x-axis?

ANSWER:

$$heta_C$$
 = 60.9 $^\circ$

Problem 1.70

A ship leaves the island of Guam and sails 270 $\,$ km at 53.0 $^{\circ}$ north of west.

Part A

In which direction must it now head so that its resultant displacement will be 127 $\,\mathrm{km}$ directly east of Guam? ANSWER:

$$\theta$$
 = 36.7 ° south of east

Correct

Part B

How far must it sail?

Express your answer with the appropriate units.

ANSWER:

$$R$$
 = 361 km

Correct

Problem 1.78

In the methane molecule, CH_4 , each hydrogen atom is at a corner of a regular tetrahedron with the carbon atom at the center. In coordinates where one of the C-H bonds is in the direction of $\hat{i}+\hat{j}+\hat{k}$, an adjacent C-H bond is in the $\hat{i}-\hat{j}-\hat{k}$ direction.

Part A

Calculate the angle between these two bonds.

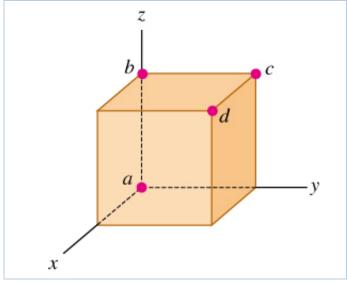
ANSWER:

$$heta$$
 = 109 $^{\circ}$

Problem 1.80

A cube is placed so that one corner is at the origin and three edges are along the x-, y-, and z -axes of a coordinate system

(the figure). Use vectors to answer the questions.



Part A

Find the angle between the edge along the z-axis (line ab) and the diagonal from the origin to the opposite corner (line ad).

ANSWER:

Correct

Part B

Find the angle between line ac (the diagonal of a face) and line ad.

ANSWER:

$$heta$$
 = 35.3 $^{\circ}$

Correct

Score Summary:

Your score on this assignment is 100%.

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