

***Physics for Scientists and Engineers with Modern
Physics 5th edition Giancoli Test Bank***

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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Addition and subtraction: If $\vec{A} - \vec{B} = 0$, then the vectors $\vec{A}$ and $\vec{B}$ have equal magnitudes and are directed in the opposite directions from each other.

A) True
B) False

Answer: B

- 2) Addition and subtraction: Under what condition is $|\vec{A} - \vec{B}| = A + B$?

A) Vectors $\vec{A}$ and $\vec{B}$ are in perpendicular directions.
B) Vectors $\vec{A}$ and $\vec{B}$ are in opposite directions.
C) The magnitude of vector $\vec{B}$ is zero.
D) Vectors $\vec{A}$ and $\vec{B}$ are in the same direction.
E) The statement is never true.

Answer: B

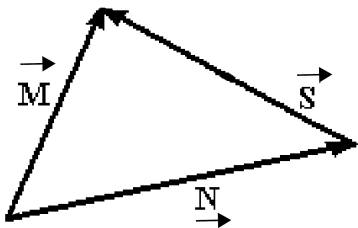
- 3) Addition and subtraction: If $A > B$, under what condition is $|\vec{A} - \vec{B}| = A - B$?

A) Vectors $\vec{A}$ and $\vec{B}$ are in perpendicular directions.
B) Vectors $\vec{A}$ and $\vec{B}$ are in the same direction.
C) The statement is never true.
D) Vectors $\vec{A}$ and $\vec{B}$ are in opposite directions.
E) The statement is always true.

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 4) Addition and subtraction: For the vectors shown in the figure, express vector $\vec{S}$ in terms of vectors $\vec{M}$ and $\vec{N}$.



Answer: $\vec{S} = \vec{M} - \vec{N}$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

5) Components: Which of the following is an accurate statement?

- A) The magnitude of a vector is independent of the coordinate system used.
- B) Rotating a vector about an axis passing through the tip of the vector does not change the vector.
- C) The magnitude of a vector can be zero even though one of its components is not zero.
- D) It is possible to add a scalar quantity to a vector.
- E) Even though two vectors have unequal magnitudes, it is possible that their vector sum is zero.

Answer: A

6) Components: The magnitude of a vector can never be less than the magnitude of one of its components.

- A) True
- B) False

Answer: A

7) Components: If the magnitude of vector $\vec{A}$ is less than the magnitude of vector $\vec{B}$, then the x component of $\vec{A}$ is less than the x component of $\vec{B}$.

- A) True
- B) False

Answer: B

8) Components: If the eastward component of vector $\vec{A}$ is equal to the westward component of vector $\vec{B}$ and their northward components are equal. Which one of the following statements about these two vectors is correct?

- A) Vector $\vec{A}$ is perpendicular to vector $\vec{B}$.
- B) Vectors $\vec{A}$ and $\vec{B}$ point in opposite directions.
- C) The magnitude of vector $\vec{A}$ is twice the magnitude of vector $\vec{B}$.
- D) Vector $\vec{A}$ is parallel to vector $\vec{B}$.
- E) The magnitude of vector $\vec{A}$ is equal to the magnitude of vector $\vec{B}$.

Answer: E

9) Unit vectors: If all the components of a vector are equal to 1, then that vector is a unit vector.

- A) True
- B) False

Answer: B

10) Scalar (dot) product: If the dot product of two nonzero vectors is zero, the vectors must be perpendicular to each other.

- A) True
- B) False

Answer: A

11) Scalar (dot) product: If two nonzero vectors point in the same direction, their dot product must be zero.

- A) True
- B) False

Answer: B

12) Scalar (dot) product: The value of the dot product of two vectors depends on the particular coordinate system being used.

- A) True
- B) False

Answer: B

13) Vector (cross) product: If two vectors are perpendicular to each other, their cross product must be zero.

- A) True
- B) False

Answer: B

14) Vector (cross) product: If two vectors point in opposite directions, their cross product must be zero.

- A) True
- B) False

Answer: A

15) Vector (cross) product: If $\vec{A}$ and $\vec{B}$ are nonzero vectors for which $\vec{A} \cdot \vec{B} = 0$, it must follow that

- A) $\vec{A}$ is parallel to $\vec{B}$.
- B) $|\vec{A} \times \vec{B}| = 1$.
- C) $|\vec{A} \times \vec{B}| = AB$.
- D) $\vec{A} \times \vec{B} = 0$.

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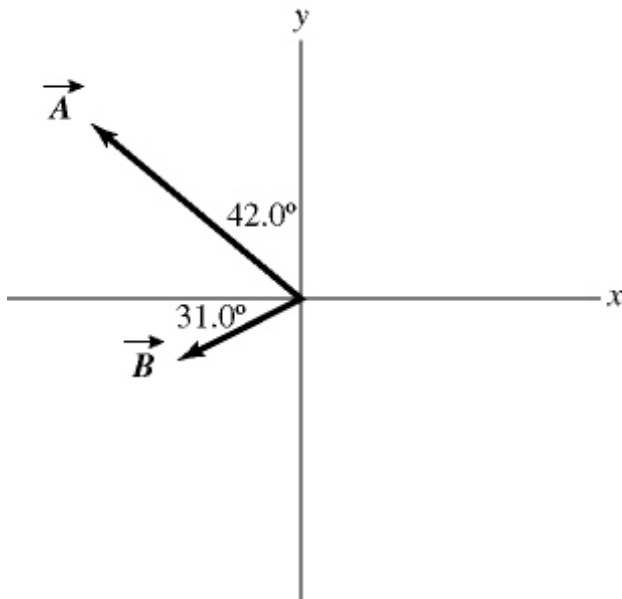
Answer: C

16) Addition and subtraction: You walk 55 m to the north, then turn 60° to your right and walk another 45 m. How far are you from where you originally started?

- A) 94 m
- B) 87 m
- C) 50 m
- D) 46 m

Answer: B

- 17) Addition and subtraction: Vectors $\vec{A}$ and $\vec{B}$ are shown in the figure. Vector $\vec{C}$ is given by $\vec{C} = \vec{B} - \vec{A}$. The magnitude of vector $\vec{A}$ is 16.0 units, and the magnitude of vector $\vec{B}$ is 7.00 units. What is the magnitude of vector $\vec{C}$?

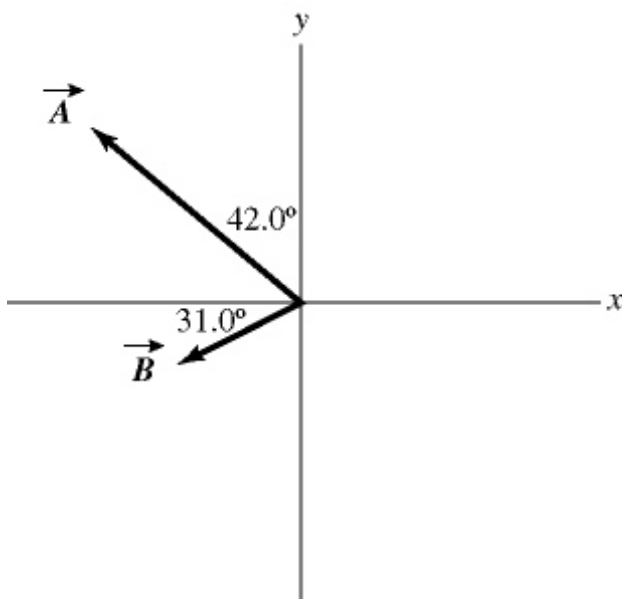


- A) 9.53
- B) 15.5
- C) 9.00
- D) 16.2
- E) 17.5

Answer: D

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- 18) Addition and subtraction: Vectors $\vec{A}$ and $\vec{B}$ are shown in the figure. Vector $\vec{C}$ is given by $\vec{C} = \vec{B} - \vec{A}$. The magnitude of vector $\vec{A}$ is 16.0 units, and the magnitude of vector $\vec{B}$ is 7.00 units. What is the angle of vector $\vec{C}$, measured counterclockwise from the $+x$ -axis?



- A) 16.9°
- B) 22.4°
- C) 292°
- D) 73.1°
- E) 287°

Answer: E

- 19) Addition and subtraction: A rabbit trying to escape a fox runs north for 8.0 m, darts northwest for 1.0 m, then drops 1.0 m down a hole into its burrow. What is the magnitude of the net displacement of the rabbit?

- A) 8.8 m
- B) 10 m
- C) 8.1 m
- D) 66 m

Answer: A

- 20) Addition and subtraction: You walk 53 m to the north, then turn 60° to your right and walk another 45 m. Determine the direction of your displacement vector. Express your answer as an angle relative to east.

A) 57° N of E
 B) 69° N of E
 C) 63° N of E
 D) 50° N of E

Answer: C

- 21) Components: Vector $\vec{A}$ has a magnitude 5.00 and points in a direction 40.0° clockwise from the negative y axis. What are the x and y components of vector $\vec{A}$.

A) $A_x = 4.29$ and $A_y = 2.16$
 B) $A_x = 3.83$ and $A_y = 3.21$
 C) $A_x = -3.21$ and $A_y = -3.83$
 D) $A_x = -3.21$ and $A_y = 3.83$
 E) $A_x = 3.83$ and $A_y = -3.21$

Answer: C

- 22) Components: The components of vector $\vec{A}$ are $A_x = +3.90$ and $A_y = -4.00$. What is the angle measured counterclockwise from the +x-axis to vector $\vec{A}$?

A) 134°
 B) 46.0°
 C) 314°
 D) 136°
 E) 224°

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Answer: C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 23) Components: Vector $\vec{A}$ has a magnitude of 5.5 cm and points along the x-axis. Vector $\vec{B}$ has a magnitude of 7.5 cm and points at $+30^\circ$ above the negative x-axis.

(a) Determine the x and y components of Vector $\vec{A}$.
 (b) Determine the x and y components of Vector $\vec{B}$.
 (c) Determine x and y components of the sum of these two vectors.
 (d) Determine the magnitude and direction of the sum of these two vectors.

Answer: (a) $A_x = 5.5$ cm, $A_y = 0$
 (b) $B_x = -6.5$ cm, $B_y = 3.8$ cm
 (c) $R_x = -1.0$ cm, $R_y = 3.8$ cm
 (d) 3.9 cm at 75° above -x-axis

- 24) Components: Vector $\vec{A}$ has a magnitude of 75.0 cm and points at 30° above the positive x -axis. Vector $\vec{B}$ has a magnitude of 25.0 cm and points along the negative x -axis. Vector $\vec{C}$ has a magnitude of 40.0 cm and points at 45° below the negative x -axis.
- Determine the x and y components of Vector $\vec{A}$.
 - Determine the x and y components of Vector $\vec{B}$.
 - Determine the x and y components of Vector $\vec{C}$.
 - Determine x and y components of the sum of these three vectors.
 - Determine the magnitude and direction of the sum of these three vectors.

Answer: (a) $A_x = 65$ cm, $A_y = 38$ cm

(b) $B_x = -25$ cm, $B_y = 0$

(c) $C_x = -28$ cm, $C_y = -28$ cm

(d) $R_x = 12$ cm, $R_y = 9.2$ cm

(e) 15 cm at 38° above $+x$ -axis

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 25) Components: A helicopter is flying horizontally with a speed of 444 m/s over a hill that slopes upward with a 2% grade (that is, the "rise" is 2% of the "run"). What is the component of the helicopter's velocity perpendicular to the sloping surface of the hill?

A) 444 m/s

B) 220 m/s

C) 435 m/s

D) 8.9 m/s

Answer: D

- 26) Components: An apple falls from an apple tree growing on a 20° slope. The apple hits the ground with an impact velocity of 16.2 m/s straight downward. What is the component of the apple's impact velocity parallel to the surface of the slope?

A) 15 m/s

B) 5.5 m/s

C) 8.7 m/s

D) 12 m/s

Answer: B

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27) Components: The components of vector $\vec{A}$ are $A_x = +2.2$ and $A_y = -6.9$, and the components of vector $\vec{B}$ are given are $B_x = -6.1$ and $B_y = -2.2$. What is the magnitude of the vector $\vec{B} - \vec{A}$?

- A) 91
- B) 6.1
- C) 9.9
- D) 9.5
- E) 0.76

Answer: D

28) Components: The components of vector $\vec{B}$ are $B_x = -3.5$ and $B_y = -9.7$, and the components of vector $\vec{C}$ are $C_x = -6$ and $C_y = +8.1$. What is the angle (less than 180 degrees) between vectors $\vec{B}$ and $\vec{C}$?

- A) 56°
- B) 106°
- C) 163°
- D) 124°
- E) 17°

Answer: D

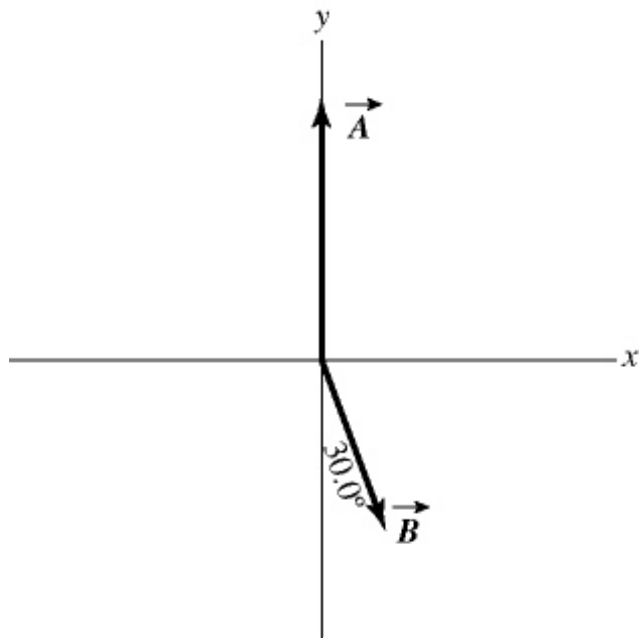
29) Components: An airplane undergoes the following displacements: First, it flies 66 km in a direction 30° east of north. Next, it flies 49 km due south. Finally, it flies 100 km 30° north of west. Using vector components, determine how far the airplane ends up from its starting point.

- A) 79 km
- B) 76 km
- C) 81 km
- D) 78 km
- E) 82 km

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

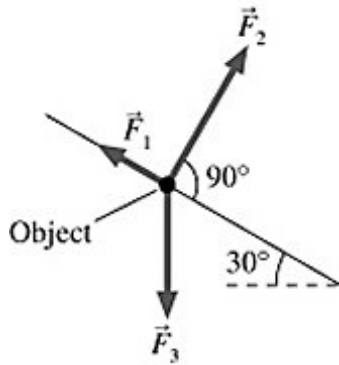
- 30) Components: In the figure, the magnitude of vector $\vec{A}$ is 18.0 units, and the magnitude of vector $\vec{B}$ is 12.0 units. What vector $\vec{C}$ must be added to the vectors $\vec{A}$ and $\vec{B}$ so that the resultant of these three vectors points in the $-x$ direction and has a magnitude of 7.50 units? Use vector components to find your answer, and express vector $\vec{C}$ by giving its magnitude and the angle it makes with the $+x$ -axis taking counterclockwise to be positive.



Answer: 15.5, 209°

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 31) Components: Three forces are exerted on an object placed on a tilted floor. Forces are vectors. The three forces are directed as shown in the figure. If the forces have magnitudes $F_1 = 1.0$ N, $F_2 = 8.0$ N and $F_3 = 7.0$ N, where N is the standard unit of force, what is the component of the *net force* $\vec{F}_{\text{net}} = \vec{F}_1 + \vec{F}_2 + \vec{F}_3$ parallel to the floor?

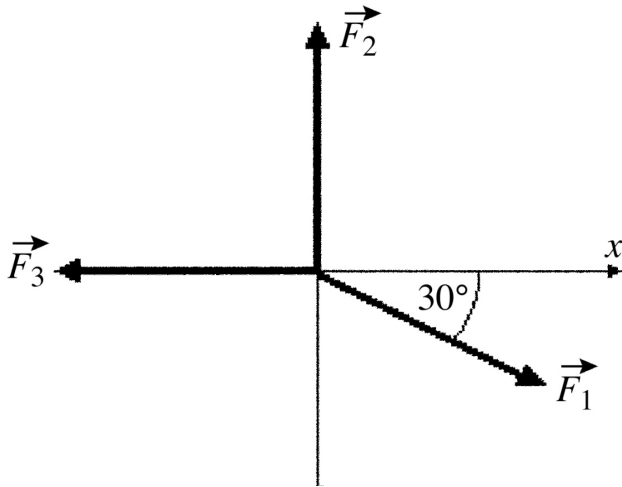


- A) 6.0 N
- B) 7.8 N
- C) 2.5 N
- D) 5.1 N

Answer: C

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- 32) Components: As shown in the figure, three force vectors act on an object. The magnitudes of the forces as shown in the figure are $F_1 = 80.0 \text{ N}$, $F_2 = 60.0 \text{ N}$, and $F_3 = 40.0 \text{ N}$, where N is the standard SI unit of force. The resultant force acting on the object is given by



- A) 20.0 N at an angle 34.3° with respect to $+x$ -axis.
- B) 40.0 N at an angle 60.0° with respect to $+x$ -axis.
- C) 60.0 N at an angle 90.0° with respect to $+x$ -axis.
- D) 35.5 N at an angle 34.3° with respect to $+x$ -axis.
- E) 180 N at an angle 60.0° with respect to $+x$ -axis.

Answer: D

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- 33) Components: A teacher sends her students on a treasure hunt. She gives the following instructions:

1. Walk 300 m north
2. Walk 400 m northwest
3. Walk 700 m east-southeast and the treasure is buried there.

As all the other students walk off following the instructions, Jane physics student quickly adds the displacements and walks in a straight line to find the treasure. How far and in what direction does Jane need to walk?

- A) 284 m in a direction 28.2° west of north
- B) 481 m in a direction 40.9° north of east
- C) 187 m in a direction 67.3° north of east
- D) 399 m in a direction 52.5° north of east
- E) The treasure position cannot be reached in one straight walk.

Answer: B

- 34) Unit vectors: Vector $\vec{A} = -3.00 \hat{i} + 3.00 \hat{j}$ and vector $\vec{B} = 3.00 \hat{i} + 4.00 \hat{j}$. What is vector $\vec{C} = \vec{A} + \vec{B}$?
- A) $0.00 \hat{i} + 3.00 \hat{j}$
 - B) $0.00 \hat{i} + 7.00 \hat{j}$
 - C) $-3.00 \hat{i} - 3.00 \hat{j}$
 - D) $-3.00 \hat{i} + 7.00 \hat{j}$
 - E) $7.00 \hat{i} + 7.00 \hat{j}$

Answer: B

- 35) Unit vectors: Vector $\vec{A} = 1.00 \hat{i} + -2.00 \hat{j}$ and vector $\vec{B} = 3.00 \hat{i} + 4.00 \hat{j}$. What are the magnitude and direction of vector $\vec{C} = \vec{A} + \vec{B}$?
- A) 6.00 in a direction 63.4° counterclockwise from the positive x axis
 - B) 7.21 in a direction 33.7° counterclockwise from the positive x axis
 - C) 4.47 in a direction 26.6° counterclockwise from the positive x axis
 - D) 7.21 in a direction 56.3° counterclockwise from the positive x axis
 - E) 4.47 in a direction 6.34° counterclockwise from the positive x axis

Answer: C

- 36) Unit vectors: What is the magnitude of $\vec{A} + \vec{B} + \vec{C}$, where $\vec{A} = 1.00 \hat{i} + 4.00 \hat{j} - 1.00 \hat{k}$, $\vec{B} = 3.00 \hat{i} - 1.00 \hat{j} - 4.00 \hat{k}$ and $\vec{C} = -1.00 \hat{i} + 1.00 \hat{j}$?
- A) 10.76
 - B) 7.07
 - C) 8.12
 - D) 2.00
 - E) 6.78

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Answer: B

- 37) Unit vectors: If $\vec{A} = +4 \hat{i} - 2 \hat{j} - 3 \hat{k}$ and $\vec{C} = -4 \hat{i} - 2 \hat{j} - 3 \hat{k}$, which of the following numbers is closest to the magnitude of $\vec{A} - \vec{C}$?
- A) 9
 - B) 8
 - C) 10
 - D) 11
 - E) 7

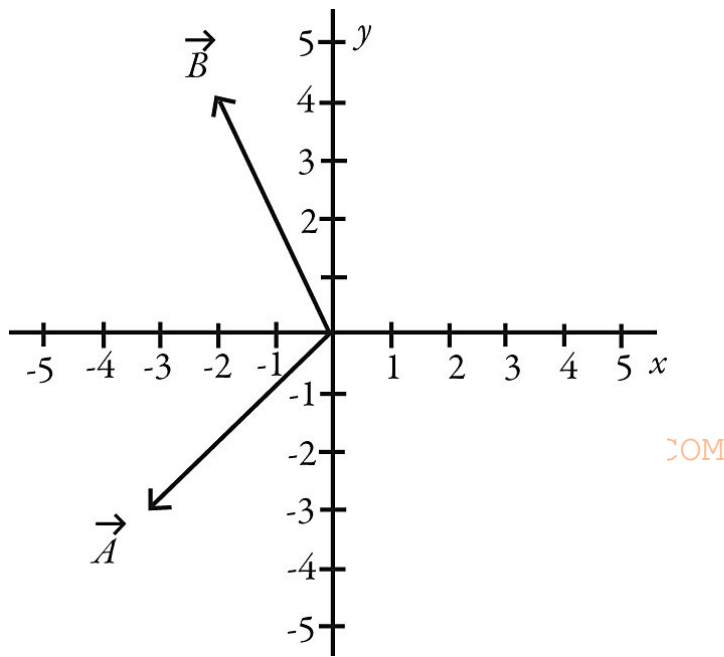
Answer: B

38) Unit vectors: Vector $\vec{A} = -1.00 \hat{i} + -2.00 \hat{j}$ and vector $\vec{B} = 3.00 \hat{i} + 4.00 \hat{j}$ What are the magnitude and direction of vector $\vec{C} = 3.00 \vec{A} + 2.00 \vec{B}$?

- A) 3.61 in a direction 56.3° counterclockwise from the positive x -axis
- B) 6.72 in a direction 34.4° counterclockwise from the positive x -axis
- C) 3.61 in a direction -56.3° counterclockwise from the positive x -axis
- D) 5.00 in a direction 56.3° counterclockwise from the positive x axis
- E) 3.61 in a direction 33.7° counterclockwise from the positive x -axis

Answer: E

39) Unit vectors: Vectors $\vec{A}$ and $\vec{B}$ are shown in the figure. What is $|-5.00 \vec{A} + 4.00 \vec{B}|$



- A) 1028
- B) 34.0
- C) $-2.00 \hat{i} - 32.0 \hat{j}$
- D) 31.8
- E) $-32.0 \hat{i} - 2.00 \hat{j}$

Answer: D

- 40) Scalar (dot) product: Determine the scalar product of $\vec{A} = 6.0\hat{i} + 4.0\hat{j} - 2.0\hat{k}$ and $\vec{B} = 5.0\hat{i} - 6.0\hat{j} - 3.0\hat{k}$.
- A) 12
 - B) $30\hat{i} + 24\hat{j} + 6\hat{k}$
 - C) 60
 - D) $30\hat{i} - 24\hat{j} + 6\hat{k}$
 - E) undefined

Answer: A

- 41) Scalar (dot) product: Determine the angle between the directions of vector $\vec{A} = 3.00\hat{i} + 1.00\hat{j}$ and vector $\vec{B} = -3.00\hat{i} + 3.00\hat{j}$.
- A) 30.0°
 - B) 117°
 - C) 26.6°
 - D) 88.1°
 - E) 45.2°

Answer: B

- 42) Scalar (dot) product: The scalar product of vector $\vec{A} = 3.00\hat{i} + 2.00\hat{j}$ and vector $\vec{B}$ is 10.0. Which of the following vectors could be vector $\vec{B}$?

- A) $2.00\hat{i} + 4.00\hat{j}$
- B) $4.00\hat{i} + 6.00\hat{j}$
- C) $2.00\hat{i} + 2.00\hat{j}$
- D) $12.0\hat{i}$
- E) $5.00\hat{i} + 4.00\hat{j}$

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Answer: C

- 43) Scalar (dot) product: The angle between vector $\vec{A} = 2.00\hat{i} + 3.00\hat{j}$ and vector $\vec{B}$ is 45.0° . The scalar product of vectors $\vec{A}$ and $\vec{B}$ is 3.00. If the x component of vector $\vec{B}$ is positive, what is vector $\vec{B}$?

- A) $0.871\hat{i} + 0.419\hat{j}$
- B) $4.76\hat{i} + 0.952\hat{j}$
- C) $2.96\hat{i} + -0.973\hat{j}$
- D) $3.42\hat{i} + 0.684\hat{j}$
- E) $1.15\hat{i} + 0.231\hat{j}$

Answer: E

- 44) Scalar (dot) product: What is the angle between the vector $\vec{A} = +3\hat{i} - 2\hat{j} - 3\hat{k}$ and the +y-axis?
- A) 155°
 - B) 90°
 - C) 65°
 - D) 115°
 - E) 25°

Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 45) Scalar (dot) product: If $\vec{A} = 3\hat{i} - \hat{j} + 4\hat{k}$ and $\vec{B} = x\hat{i} + \hat{j} - 5\hat{k}$, find x so $\vec{B}$ will be perpendicular to $\vec{A}$.

Answer: 7

- 46) Scalar (dot) product: Two boys searching for buried treasure are standing underneath the same tree. One boy walks 18 m east and then 18 m north. The other boy walks 16 m west and then 11 m north. Find the scalar product of their net displacements from the tree.

Answer: -90 m^2

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 47) Scalar (dot) product: A rectangular box is positioned with its vertices at the following points:

$$A = (0,0,0) \quad C = (2,4,0) \quad E = (0,0,3) \quad G = (2,4,3)$$

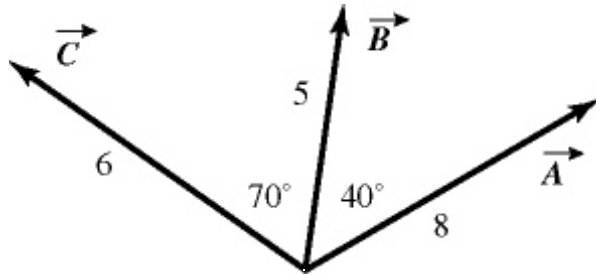
$$B = (2,0,0) \quad D = (0,4,0) \quad F = (2,0,3) \quad H = (0,4,3)$$

If the coordinates all have three significant figures, the angle between the line segments AG and AH is closest to:

- A) 22.5° .
- B) 21.8° .
- C) 45.0° .
- D) 36.9° .
- E) 26.6° .

Answer: B

- 48) Scalar (dot) product: For the vectors shown in the figure, assume numbers are accurate to two significant figures. The scalar product $\vec{A} \times \vec{C}$ is closest to



- A) zero.
- B) -45.
- C) -16.
- D) 45.
- E) 16.

Answer: C

- 49) Vector (cross) product: What is the vector product of $\vec{A} = 2.00 \hat{i} + 3.00 \hat{j} + 1.00 \hat{k}$ and $\vec{B} = 1.00 \hat{i} - 3.00 \hat{j} - 2.00 \hat{k}$?

- A) $-5.00 \hat{i} + 2.00 \hat{j} - 6.00 \hat{k}$
- B) $-3.00 \hat{i} + 5.00 \hat{j} - 9.00 \hat{k}$
- C) $-4.00 \hat{i} + 3.00 \hat{j} - 1.00 \hat{k}$
- D) $2.00 \hat{i} - 9.00 \hat{j} - 2.00 \hat{k}$
- E) $-9.00 \hat{i} - 3.00 \hat{j} - 3.00 \hat{k}$

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Answer: B

- 50) Vector (cross) product: What is the magnitude of the cross product of a vector of magnitude 2.00 m pointing east and a vector of magnitude 4.00 m pointing 30.0° west of north?

- A) 8.00
- B) 6.93
- C) -4.00
- D) 4.00
- E) -6.93

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 51) Vector (cross) product: If the magnitude of the cross product of two vectors is one-half the dot product of the same vectors, what is the angle between the two vectors?

Answer: 26.6°

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

52) Vector (cross) product: If $\vec{C} = -4\hat{i} - 2\hat{j} - 3\hat{k}$, what is $\vec{C} \times \hat{j}$?

- A) $+3\hat{i} - 4\hat{k}$
- B) $+3\hat{i} + 4\hat{k}$
- C) $-3\hat{i} - 2\hat{j} + 4\hat{k}$
- D) $-3\hat{i} + 4\hat{k}$
- E) $+3\hat{i} + 2\hat{j} - 4\hat{k}$

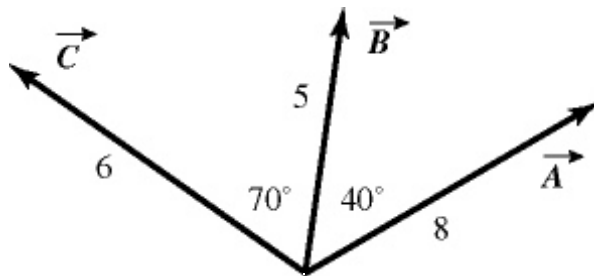
Answer: A

53) Vector (cross) product: If $\vec{B} = -2\hat{i} - 6\hat{j} + 2\hat{k}$ and $\vec{C} = -2\hat{i} - 2\hat{j} - 3\hat{k}$, which of the following numbers is closest to the magnitude of $\vec{C} \times \vec{B}$?

- A) 21
- B) 13
- C) 25
- D) 17
- E) 9

Answer: C

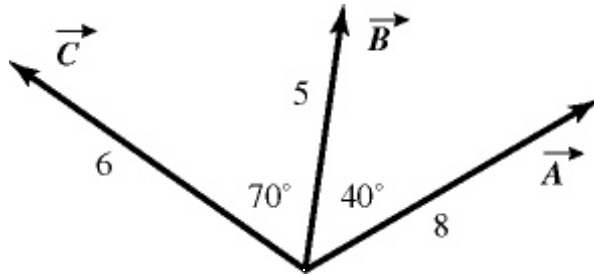
54) Vector (cross) product: For the vectors shown in the figure, find the magnitude and direction of $\vec{B} \times \vec{A}$, assuming that the quantities shown are accurate to two significant figures.



- A) 31, directed into the plane
- B) 31, directed on the plane
- C) 31, directed out of the plane
- D) 26, directed into the plane
- E) 26, directed out of the plane

Answer: D

55) Vector (cross) product: For the vectors shown in the figure, find the magnitude and direction of the vector product $\vec{A} \times \vec{C}$ that the quantities shown are accurate to two significant figures.



- A) 45, directed on the plane
- B) 16, directed out of the plane
- C) 45, directed out of the plane
- D) 16, directed into the plane
- E) 45, directed into the plane

Answer: C

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Answer Key

Testname: UNTITLED2

1) B

ID: upg2 2.1.1- 1

Diff: 0

Objective:

2) B

ID: upg2 2.1.1- 2

Diff: 0

Objective:

3) B

ID: upg2 2.1.1- 3

Diff: 0

Objective:

4) $\vec{S} = \vec{M} - \vec{N}$

ID: upg2 2.1.1- 4

Diff: 0

Objective:

5) A

ID: upg2 2.1.2- 1

Diff: 0

Objective:

6) A

ID: upg2 2.1.2- 2

Diff: 0

Objective:

7) B

ID: upg2 2.1.2- 3

Diff: 0

Objective:

8) E

ID: upg2 2.1.2- 4

Diff: 0

Objective:

9) B

ID: upg2 2.1.3- 1

Diff: 0

Objective:

10) A

ID: upg2 2.1.4- 1

Diff: 0

Objective:

11) B

ID: upg2 2.1.4- 2

Diff: 0

Objective:

12) B

ID: upg2 2.1.4- 3

Diff: 0

Objective:

Answer Key

Testname: UNTITLED2

13) B

ID: upg2 2.1.5- 1

Diff: 0

Objective:

14) A

ID: upg2 2.1.5- 2

Diff: 0

Objective:

15) C

ID: upg2 2.1.5- 3

Diff: 0

Objective:

16) B

ID: upg2 2.2.1- 1

Diff: 0

Objective:

17) D

ID: upg2 2.2.1- 2

Diff: 0

Objective:

18) E

ID: upg2 2.2.1- 3

Diff: 0

Objective:

19) A

ID: upg2 2.2.1- 4

Diff: 0

Objective:

20) C

ID: upg2 2.2.1- 5

Diff: 0

Objective:

21) C

ID: upg2 2.2.2- 1

Diff: 0

Objective:

22) C

ID: upg2 2.2.2- 2

Diff: 0

Objective:

23) (a) $A_x = 5.5$ cm, $A_y = 0$ (b) $B_x = -6.5$ cm, $B_y = 3.8$ cm(c) $R_x = -1.0$ cm, $R_y = 3.8$ cm(d) 3.9 cm at 75° above -x-axis

ID: upg2 2.2.2- 3

Diff: 0

Objective:

Answer Key

Testname: UNTITLED2

- 24) (a) $A_x = 65 \text{ cm}$, $A_y = 38 \text{ cm}$
 (b) $B_x = -25 \text{ cm}$, $B_y = 0$
 (c) $C_x = -28 \text{ cm}$, $C_y = -28 \text{ cm}$
 (d) $R_x = 12 \text{ cm}$, $R_y = 9.2 \text{ cm}$
 (e) 15 cm at 38° above $+x$ -axis

ID: upg2 2.2.2- 4

Diff: 0

Objective:

25) D

ID: upg2 2.2.2- 5

Diff: 0

Objective:

26) B

ID: upg2 2.2.2- 6

Diff: 0

Objective:

27) D

ID: upg2 2.2.2- 7

Diff: 0

Objective:

28) D

ID: upg2 2.2.2- 8

Diff: 0

Objective:

29) A

ID: upg2 2.2.2- 9

Diff: 0

Objective:

30) 15.5 , 209°

ID: upg2 2.2.2- 10

Diff: 0

Objective:

31) C

ID: upg2 2.2.2- 11

Diff: 0

Objective:

32) D

ID: upg2 2.2.2- 12

Diff: 0

Objective:

33) B

ID: upg2 2.2.2- 13

Diff: 0

Objective:

34) B

ID: upg2 2.2.3- 1

Diff: 0

Objective:

Answer Key

Testname: UNTITLED2

35) C

ID: upg2 2.2.3- 2

Diff: 0

Objective:

36) B

ID: upg2 2.2.3- 3

Diff: 0

Objective:

37) B

ID: upg2 2.2.3- 4

Diff: 0

Objective:

38) E

ID: upg2 2.2.3- 5

Diff: 0

Objective:

39) D

ID: upg2 2.2.3- 6

Diff: 0

Objective:

40) A

ID: upg2 2.2.4- 1

Diff: 0

Objective:

41) B

ID: upg2 2.2.4- 2

Diff: 0

Objective:

42) C

ID: upg2 2.2.4- 3

Diff: 0

Objective:

43) E

ID: upg2 2.2.4- 4

Diff: 0

Objective:

44) D

ID: upg2 2.2.4- 5

Diff: 0

Objective:

45) 7

ID: upg2 2.2.4- 6

Diff: 0

Objective:

46) -90 m^2

ID: upg2 2.2.4- 7

Diff: 0

Objective:

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Answer Key

Testname: UNTITLED2

47) B

ID: upg2 2.2.4- 8

Diff: 0

Objective:

48) C

ID: upg2 2.2.4- 9

Diff: 0

Objective:

49) B

ID: upg2 2.2.5- 1

Diff: 0

Objective:

50) B

ID: upg2 2.2.5- 2

Diff: 0

Objective:

51) 26.6°

ID: upg2 2.2.5- 3

Diff: 0

Objective:

52) A

ID: upg2 2.2.5- 4

Diff: 0

Objective:

53) C

ID: upg2 2.2.5- 5

Diff: 0

Objective:

54) D

ID: upg2 2.2.5- 6

Diff: 0

Objective:

55) C

ID: upg2 2.2.5- 7

Diff: 0

Objective:

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