

## Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

Show work to  
justify your answers!

1. Identify the ordered pair that represents  $\overrightarrow{AB}$  given A(8, -2) and B(-3, 1)
- $\langle -11, -1 \rangle$
  - $\langle 5, -1 \rangle$
  - $\langle 11, -3 \rangle$
  - $\langle -11, 3 \rangle$
2. Find the magnitude that represents  $\overrightarrow{BA}$  given A(8, -2) and B(-3, 1)
- $\sqrt{130}$
  - $\sqrt{112}$
  - $\sqrt{122}$
  - $\sqrt{26}$
3. Given vectors  $\vec{u} = 7\vec{i} + 3\vec{j}$  and  $\vec{v} = -4\vec{i} + 3\vec{j}$ , find  $5\vec{u} - 4\vec{v}$  in terms of unit vectors  $\vec{i}$  and  $\vec{j}$ .
- $51\vec{i} + 3\vec{j}$
  - $-2\vec{i} + 50\vec{j}$
  - $4\vec{i} + 50\vec{j}$
  - $54\vec{i} + 50\vec{j}$
4. Given  $\vec{u} = \langle 1, -1, 3 \rangle$  and  $\vec{v} = \langle -4, 5, 3 \rangle$  find an ordered triple that represents  $3\vec{u} - 2\vec{v}$ .
- $\langle 16, 1, -7 \rangle$
  - $\langle 11, -13, 3 \rangle$
  - $\langle 10, -12, 1 \rangle$
  - $\langle 7, -7, 16 \rangle$
5. Find the magnitude of  $\overrightarrow{WX}$  for  $W(-3, 5, 4)$  and  $X(9, 5, 3)$ .
- $\sqrt{137}$
  - $\sqrt{145}$
  - 140
  - 137
6. Find the inner (dot) product of  $\vec{u}$  and  $\vec{v}$  if  $\vec{u} = \langle 7, -3 \rangle$  and  $\vec{v} = \langle -3, -5 \rangle$ .
- 36
  - 36
  - 6
  - 6
7. Given C(3, -2, 4) and D(5, 9, -3), find the vector representation of  $\overrightarrow{DC}$ .
- $\langle 8, 7, 1 \rangle$
  - $\langle -2, -11, 1 \rangle$
  - $\langle -2, -11, 7 \rangle$
  - $\langle 2, 11, -7 \rangle$
8. Given C(3, -2, 4) and D(5, 9, -3), write  $\overrightarrow{DC}$  as a sum of unit vectors
- $-2\vec{i} - 11\vec{j} + 7\vec{k}$
  - $2\vec{i} + 11\vec{j} - 7\vec{k}$
  - $-2\vec{i} - 11\vec{j} + \vec{k}$
  - $8\vec{i} + 7\vec{j} + \vec{k}$
9. Find the inner (dot) product of  $\vec{u}$  and  $\vec{v}$  if  $\vec{u} = \langle 9, 5, 3 \rangle$  and  $\vec{v} = \langle -3, 2, 5 \rangle$ . Then state if the vectors are perpendicular.
- 0, yes
  - 13, no
  - 13, no
  - 2, no
10. Find the cross product  $\langle -6, 7, 2 \rangle \times \langle 8, 5, -3 \rangle$ . Clearly show all steps.

CHECK#1-12

AAA

BB

C

DDD

 $\langle -31, -2, -86 \rangle$ 

-10.57 -8

-4.27 3 32

11. Carefully write a complete matrix equation that represents the system of equations. Then solve for x, y, and z.

$$\begin{aligned} 2x - 11y + 2z &= 15 \\ -4y + z &= -20 \\ -x + 6y - z &= -6 \end{aligned}$$

$$\left[ \begin{array}{ccc|c} & & & \\ & & & \\ & & & \end{array} \right] = \left[ \begin{array}{c} \\ \\ \end{array} \right] \rightarrow \left[ \begin{array}{c|c} x & \\ y & \\ z & \end{array} \right] = \left[ \begin{array}{c} \\ \\ \end{array} \right]$$

calculator command: \_\_\_\_\_

A                    B

12. Vector  $v$  has a magnitude of 11.4 meters and a direction of  $248^\circ$ . Find the horizontal and vertical components of  $v$ . Sketch a diagram using the appropriate quadrant.

**#13-17: Clearly show all steps!**

13. Determine if the vectors are perpendicular (justify your answer using the dot product.)

$$u = \left\langle 8, \frac{2}{3} \right\rangle \quad v = \left\langle \frac{1}{2}, -6 \right\rangle$$

14. Determine if the vectors are perpendicular (justify your answer using the dot product.)

$$u = \langle 2, -1, 4 \rangle \quad v = \langle 6, -2, 1 \rangle$$

15. Find a vector that is perpendicular to the given vectors (use the cross product.)

$$u = \langle 5, -2, 5 \rangle \quad v = \langle -1, 0, -3 \rangle$$

**CHECK#13-21**

6i + 10j - 2k no

0 18 19.08 yes

$\sqrt{41}$  41.12 54.79

70.92 98.1

172.65 308.7

16. Find the angle between the two given vectors.

$$p = \langle -3, 1 \rangle \quad q = \langle 2, 4 \rangle$$

17. Find the angle between the two given vectors.

$$r = \langle -3, 2, 0 \rangle \quad s = \langle 1, 4, 1 \rangle$$

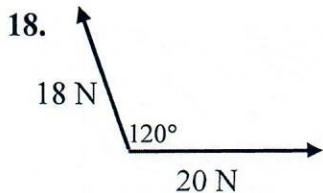
**#18-19:** Find the magnitude **and** direction of the resultant vector. *Carefully show all steps & label measurements.*

**Reminder:**

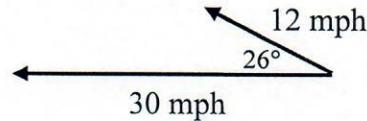
1<sup>st</sup> Form a parallelogram to find the resultant vector  $v$ .

2<sup>nd</sup> Sketch a separate triangle diagram/graph with the tail (initial point) placed at the origin.

3<sup>rd</sup> Solve for the magnitude and direction of  $v$ .



19. Hint: the resultant force points toward Quadrant 2.



20. Calculate the bearing (direction) of vector  $\vec{v} = 4i - 5j$ .

Sketch a diagram and show all work.

Calculate the angle in degrees, round to the nearest tenth.

21. Calculate the magnitude of vector  $\vec{v} = 4i - 5j$ .

Show work, express your answer in radical form.

#22-28 Given:  $A = \begin{bmatrix} 3 & 2 \\ -1 & 5 \end{bmatrix}$      $B = \begin{bmatrix} -3 & 0 \\ 2 & -7 \end{bmatrix}$

Ok to solve with a calculator or by hand...your choice!

22. Find  $A - B$

23.  $3X + A = B$  Solve for X.

24. Find  $AB$ .

25. Find  $A^{-1}$

26. Find  $B^{-1}$

27. Evaluate the determinant  $\begin{vmatrix} -2 & -5 \\ 7 & 3 \end{vmatrix}$

28. Evaluate the determinant  $\begin{vmatrix} 3 & 2 & -4 \\ 8 & 1 & 5 \\ -1 & 3 & 7 \end{vmatrix}$

**CHECK ANSWERS #22-28:**

$$\begin{array}{lll} -246 & 29 & \begin{bmatrix} -2 & -2 \\ 1 & -4 \end{bmatrix} \begin{bmatrix} \frac{-1}{3} & 0 \\ \frac{-2}{21} & \frac{-1}{7} \end{bmatrix} \\ & & \begin{bmatrix} 5 & -2 \\ 1 & 17 \end{bmatrix} \begin{bmatrix} 6 & 2 \\ -3 & 12 \end{bmatrix} \\ \begin{bmatrix} -5 & -14 \\ 13 & -35 \end{bmatrix} & & \begin{bmatrix} 1 & 3 \\ 17 & 17 \end{bmatrix} \end{array}$$