



**#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.

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

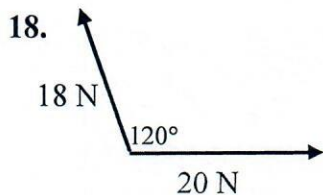
17. Find the angle between the two given vectors.

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

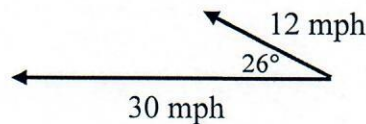
**#18-19:** Find the magnitude **and** direction of the resultant vector. *Carefully show all steps & label measurements.*

**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:**

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