Vectors Quiz 2 Version 1

Thursday, May 23, 2024

Name:



1. Solve for k if we know that  $\vec{a} = (3, -8, 2)$ ,  $\vec{b} = (-4, 7, 1)$  and  $\vec{c} = (29, -70, k)$  are coplanar 14

$$3 \times -4y = 29$$
  
 $-8 \times +7y = -70$   
 $2 \times +y = K$ 

$$3 \times = 4y + 29$$
 $X = 4y + 29$ 
 $3$ 

$$2x+y=K -8(\frac{4y+29}{3})+7y=-70$$
  
 $2(7)-2=K -32y-732.7 --70$ 

$$\frac{-32y - 232 + 7y}{3} = -70$$

$$\frac{3 \times +8 = 29}{10}$$

$$-37y - 232 + 21y = -210$$

$$\frac{3}{3} = 22$$

$$|y = -2|$$

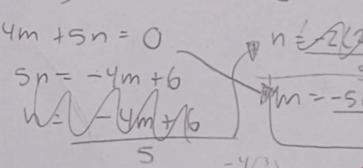
$$3 \times + 2 = 29$$

$$|x = 7|$$

k = 12

2. Give possible values for m and n such that the vectors  $\vec{u} = (3, m, 5)$  and  $\vec{v} = (-2, 4, n)$  are perpendicular. There are many different possible answers here. (No decimal approximations).

(3,m,5). (-2,4,n)=0



A possible pair of values making the vectors perpendicular are m =(There are many different possible answers; do not use decimal approximations.)

3. Determine the measure of the angle between the vectors  $\vec{c} = \overline{(-4,1,2)}$  and  $\vec{d} = \overline{(1,5,-2)}$ . Round your answer to the nearest tenth of a degree (i.e., one decimal place) if necessary.

$$(-4,1,2)\cdot(1,5,-2)=(4^2+1^2+2^2)(1^2+5^2+62)^2)\cos\theta$$
  
 $-4+5-4=(12)(30)(056)$ 

Round your answer to one tenth of a degree if necessary (i.e., one decimal place).

4. The vectors  $\vec{a}$ ,  $\vec{b}$  and  $\vec{c}$  are mutually perpendicular (i.e., each of the vectors is perpendicular with each of the other vectors). If we know that  $|\vec{a}| = 6$ ,  $|\vec{b}| = 11$  and  $|\vec{c}| = 4$ , evaluate  $(\vec{a} - \vec{c}) \cdot (\vec{c} + \vec{b} - \vec{a})$ 

$$= (\vec{a} \cdot \vec{c}) \cdot (\vec{c} + \vec{b} - \vec{a})$$

$$= (\vec{a} \cdot \vec{c}) + (\vec{a} \cdot \vec{b}) - (\vec{a} \cdot \vec{c}) - (\vec{c} \cdot \vec{c}) - (\vec{c} \cdot \vec{a})$$

$$= -(\vec{a} \cdot \vec{c}) + (\vec{a} \cdot \vec{c}) - (\vec{a} \cdot \vec{c}) - (\vec{c} \cdot \vec{a}) - (\vec{c} \cdot \vec{a})$$

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$$(\vec{a} - \vec{c}) \cdot (\vec{c} + \vec{b} - \vec{a}) = -52$$