Trig 8.4

(dot)

Find the inner product of two vectors $= 0$ $\perp$

Find the cross product of two vectors

Determine whether two vectors are perpendicular

Quiz 8.3-8.4 is ~~Wed~~. Mon.

MCT 8.1-8.4 ~~Thurs~~. Tues.

Is $a \cdot b = b \cdot a$?

Is $axb = bxa$?

whiteboards

Find each inner product and state whether the vectors are perpendicular. Write *yes* or *no*.

11. $\langle 4, 8\rangle \cdot \langle 6, -3\rangle$

12. $\langle 3, 5\rangle \cdot \langle 4, -2\rangle$

13. $\langle 5, -1\rangle \cdot \langle -3, 6\rangle$

14. $\langle 7, 2\rangle \cdot \langle 0, -2\rangle$

15. $\langle 8, 4\rangle \cdot \langle 2, 4\rangle$

$16 + 16$

not $\perp$

16. $\langle 4, 9, -3\rangle \cdot \langle -6, 7, 5\rangle$

$-24 + 63 + -15$

not $\perp$

WB 8,4

Find each cross product. Then verify that the resulting vector is perpendicular to the given vectors.

21. $\langle 0, 1, 2\rangle \times \langle 1, 1, 4\rangle$

22. $\langle 5, 2, 3\rangle \times \langle -2, 5, 0\rangle$

+ − +
− + −
+ − +

cofactors

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 0 & 1 & 2 \\ 1 & 1 & 4 \end{vmatrix} = +\vec{i}\begin{vmatrix} 1 & 2 \\ 1 & 4 \end{vmatrix} - \vec{j}\begin{vmatrix} 0 & 2 \\ 1 & 4 \end{vmatrix} + \vec{k}\begin{vmatrix} 0 & 1 \\ 1 & 1 \end{vmatrix}$$

$= 2\vec{i} + 2\vec{j} - 1\vec{k}$

$4 \quad 2 \quad 1$

$0 \quad 0$

no

Is axb = bxa?

$\langle 2, 2, -1\rangle$

$0 + 2 \times -2 = 0$

$2 + 2 - 4 = 0$

$* \; 2\vec{i} + 2\vec{j} - \vec{k}$

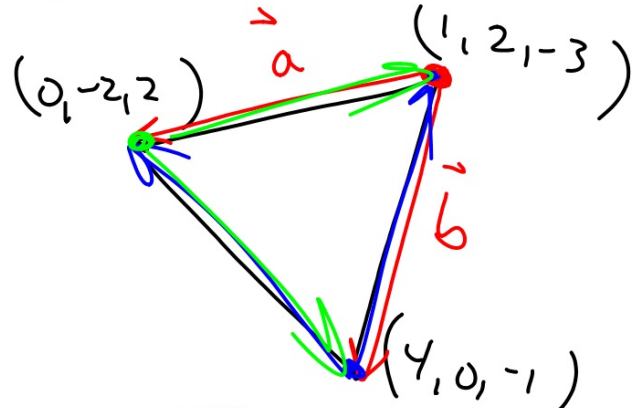
Find a vector ~~perpendicular~~ to the plane containing the given points.

29. $(0, -2, 2)$, $(1, 2, -3)$, and $(4, 0, -1)$

$a \times b$

$b \times a$

Points in the plane form vectors



(multiple answers are possible...
depends on how you set it up)

$\vec{a} = \langle -1, -4, 5 \rangle$

$\vec{b} = \langle 3, -2, 2 \rangle$

$\vec{i}$	$\vec{j}$	$\vec{k}$
-1	-4	5
3	-2	2

$$\vec{i}\begin{vmatrix} -4 & 5 \\ -2 & 2 \end{vmatrix} - \vec{j}\begin{vmatrix} -1 & 5 \\ 3 & 2 \end{vmatrix} + \vec{k}\begin{vmatrix} -1 & -4 \\ 3 & -2 \end{vmatrix}$$

$-10 \qquad 15 \qquad -12$

$-8 \qquad -2 \qquad 2$

$-2\vec{i} + 17\vec{j} + 14\vec{k}$

$a \times b \overset{?}{=} b \times a$

$\vec{i} \quad \vec{j} \quad \vec{k}$

$b \times a \quad 3 \quad -2 \quad 2$

$-1 \quad -4 \quad 5$

$+\vec{i}\begin{vmatrix} -2 & 2 \\ -4 & 5 \end{vmatrix} - \vec{j}\begin{vmatrix} 3 & 2 \\ -1 & 5 \end{vmatrix} + \vec{k}\begin{vmatrix} 3 & -2 \\ -1 & -4 \end{vmatrix}$

$-8 \qquad -2 \qquad 2$

$-10 \qquad 15 \qquad -12$

$-2\vec{i} - 17\vec{j} - 14\vec{k}$

$2\vec{i} + 17\vec{j} + 14\vec{k}$

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