Answer on Question #52180 – Math – Vector Calculus

Question

Let a = 2i - j and b = i + j + k , evaluate a x b.
3k+2j-i
i +2j+3k
3k-2j-i
i+2j-3k

Solution

If a = 2i - j and b = i + j + k, then the cross product $a \times b$ is

$$a \times b = \begin{vmatrix} i & j & k \\ 2 & -1 & 0 \\ 1 & 1 & 1 \end{vmatrix} = i \begin{vmatrix} -1 & 0 \\ 1 & 1 \end{vmatrix} - j \begin{vmatrix} 2 & 0 \\ 1 & 1 \end{vmatrix} + k \begin{vmatrix} 2 & -1 \\ 1 & 1 \end{vmatrix}$$
$$= i(-1*1 - 1*0) - j(2*1 - 1*0) + k(2*1 - 1(-1)) = -i - 2j + 3k.$$

Answer: $a \times b = 3k - 2j - i.$