Problem 3.26 j, k and l, and 3.28 from Fletch's book

$\vec{A} = -8\hat{i} + 12\hat{j}$

$\vec{B} = -4\hat{i} - 3\hat{j}$

$\vec{C} = 5\hat{i} + 6\hat{j} - 7\hat{k}$

$\vec{D} = 7\angle(-60^\circ)$

$\vec{E} = 12\angle 225^\circ$

j.) AxB

k.) CxB

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j.) AxB

$$\vec{A}x\vec{B} = \left|\begin{array}{ccc|cc} \hat{i} & \hat{j} & \hat{k} & \hat{i} & \hat{j} \\ -8 & 12 & 0 & -8 & 12 \\ -4 & -3 & 0 & -4 & -3 \end{array}\right.$$

$$= [(12)(0)-(0)(-3)]\hat{i} + [(0)(-4)-(-8)(0)]\hat{j} + [(-8)(-3)-(12)(-4)]\hat{k}$$

$$= +72\hat{k}$$

k.) CxB

$$\vec{C}x\vec{B} = \left|\begin{array}{ccc|cc} \hat{i} & \hat{j} & \hat{k} & \hat{i} & \hat{j} \\ 5 & 6 & -7 & 5 & 6 \\ -4 & -3 & 0 & -4 & -3 \end{array}\right.$$

$$= [(6)(0)-(-7)(-3)]\hat{i} + [(-7)(-4)-(5)(0)]\hat{j} + [(5)(-3)-(6)(-4)]\hat{k}$$

$$= -21\hat{i} - 28\hat{j} + 9\hat{k}$$

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l.) DxE

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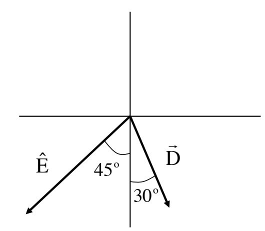
l.) AxB (note that the angle is shown in the sketch)

$$|\vec{D}x\vec{E}| = |\vec{D}||\vec{E}|\sin\phi$$

$$= (7)(12)\sin(75^\circ)$$

$$= 81.12$$



Using the right-hand rule and noting that the first vector is "D," we get a direction of -k making the cross product:

$$|\vec{D}x\vec{E}| = -81.12\hat{k}$$

Problem 3.28 from Fletch's book

A cross product between two vectors gives us a new vector whose direction is perpendicular to the plane defined by the two vectors and whose magnitude is equal to the product of the magnitude of one of the vectors and the magnitude of the component of the second vector *perpendicular* to the first vector.