

Let $\vec{a} = (1, 1, 0)$ $\vec{b} = (1, 0, -1)$ $\vec{c} = (0, 1, 1)$

$$\begin{array}{ccc} 1 & 1 & 0 \\ 1+0 & 0+1 & -1+1 \\ =1 & =1 & =0 \end{array}$$

$$\begin{array}{ccc} 1 & 1 & 0 \\ 1 & 1 & 0 \end{array}$$

$$\begin{array}{ccccc} 0 & 1 & 1 & 0 & 1 \\ 1+1 & 1+0 & 0-1 & 2 & 1-1 \\ =2 & =1 & =-1 & & \end{array}$$

$$\begin{aligned} \vec{a} \times (\vec{b} \times \vec{c}) &= (1)(0) - (0)(1) = 0 \\ & (0)(1) - (1)(0) = 1 \\ & (1)(1) - (1)(1) = 0 \end{aligned}$$

$$\boxed{\vec{a} \times (\vec{b} \times \vec{c}) = (0, 1, 0)}$$

$$\begin{aligned} (\vec{a} \times \vec{b}) \times \vec{c} &= (1)(-1) - (1)(1) = -2 \\ & (1)(2) - (0)(-1) = 2 \\ & (0)(1) - (1)(2) = -2 \end{aligned}$$

$$\boxed{(\vec{a} \times \vec{b}) \times \vec{c} = (-2, 2, -2)}$$

$$\vec{a} \times (\vec{b} \times \vec{c}) \neq (\vec{a} \times \vec{b}) \times \vec{c}$$