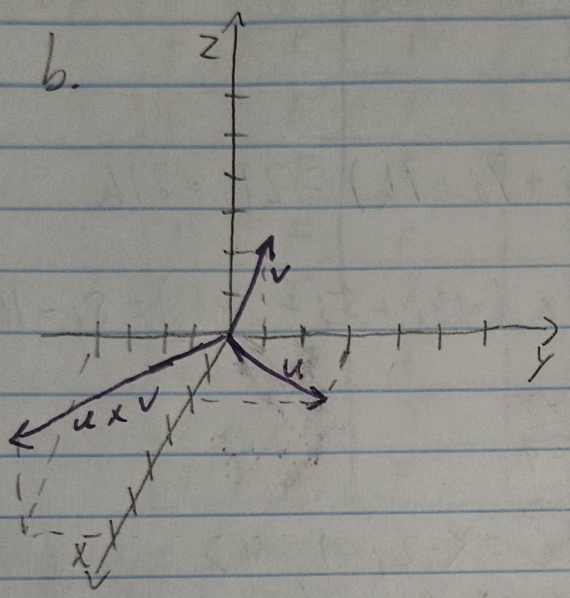
185. a. $\langle 6, -4, 2 \rangle$

$u \times v = \langle (6-0), (4-0), (2-0) \rangle = \langle 6, 4, 2 \rangle$

b.



199. $\langle -1, e^t, -e^{-t} \rangle$

$$u \times v = \begin{vmatrix} i & j & k \\ -1 & 0 & e^t \\ 1 & e^{-t} & 0 \end{vmatrix} = \begin{vmatrix} 0 & e^t \\ e^{-t} & 0 \end{vmatrix} i - \begin{vmatrix} -1 & e^t \\ 1 & 0 \end{vmatrix} j + \begin{vmatrix} -1 & 0 \\ 1 & e^{-t} \end{vmatrix} k$$

$$= (0 - e^0) i - (0 - e^t) j + (-e^{-t} - 0) k = -i + e^t j - e^{-t} k$$

201. $-26i + 17j + 9k$

$$a = \begin{vmatrix} i & j & k \\ 2 & -1 & 5 \\ 0 & 1 & 8 \end{vmatrix} = -13i - 16j + 2k$$

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

$$(a - 2b) \times c = (-11i - 20j + 6k) \times (i + j + k) = -26i + 17j + 9k$$

202. $5i - 10j + 5k$

$$a = \begin{vmatrix} i & j & k \\ 2 & -1 & 5 \\ 0 & 1 & 8 \end{vmatrix} = -13i - 16j + 2k$$

$$3b = 3\begin{vmatrix} i & j & k \\ 0 & -1 & 1 \\ 7 & 1 & -1 \end{vmatrix} = 3(0i + 7j + 7k) = 21j + 21k$$

$$c \times (a + 3b) = (i - k) \times (-13i + 5j + 23k) = 5i - 10j + 5k$$

211. a. $5\sqrt{6}$ b. $\frac{5\sqrt{6}}{2}$ c. $\frac{5\sqrt{6}}{\sqrt{59}}$

$\vec{AB} = \langle -1, 2, 3 \rangle$ $\vec{AC} = \langle -2, -1, -4 \rangle$

$\vec{AB} \times \vec{AC} = \langle (-8+3), -(4+6), (1+4) \rangle = \langle -5, -10, 5 \rangle$

$\|\vec{AB} \times \vec{AC}\| = \sqrt{25 + 100 + 25} = \sqrt{150} = 5\sqrt{6}$

area of $\triangle ABC = \frac{\|\vec{AB} \times \vec{AC}\|}{2} = \frac{5\sqrt{6}}{2}$

$\vec{BC} = \langle -1, -3, -7 \rangle$ $\|\vec{BC}\| = \sqrt{1 + 9 + 49} = \sqrt{59}$

$\frac{\|\vec{AB} \times \vec{AC}\|}{\|\vec{BC}\|} = \frac{5\sqrt{6}}{\sqrt{59}}$

235. 8.66 ft-lb

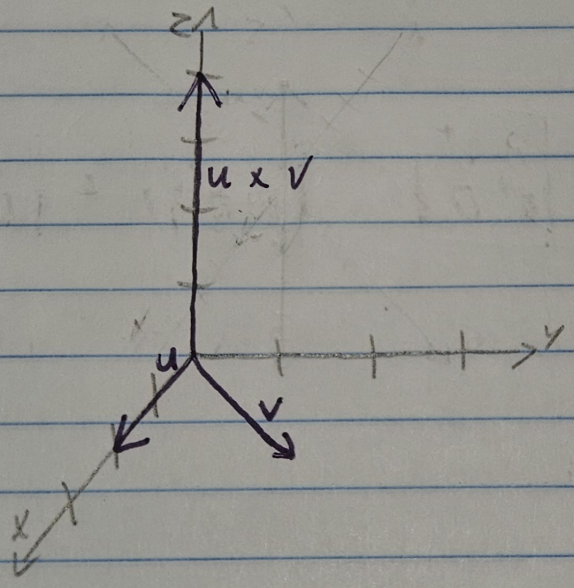
$\tau = \|r \times F\| = \|r\|\|F\| \sin\theta = 1(10)\sin 60° \approx 8.66$

2.4

183. a. $\langle 0, 0, 4 \rangle$

$u \times v = \langle (0-0), -(0-0), (4-0) \rangle = \langle 0, 0, 4 \rangle$

b.



184. a. $\langle 1, 1, 1 \rangle$

$u \times v = \langle (0+1), -(0-1), (3-2) \rangle = \langle 1, 1, 1 \rangle$

b.