Sect 1.3 #2c, 4, 6, 15a

2c) $\begin{vmatrix} 1 & 4 & 9 \\ 4 & 9 & 16 \\ 9 & 16 & 25 \end{vmatrix} = 1\begin{vmatrix} 9 & 16 \\ 16 & 25 \end{vmatrix} - 4\begin{vmatrix} 4 & 16 \\ 9 & 25 \end{vmatrix} + 9\begin{vmatrix} 4 & 9 \\ 9 & 16 \end{vmatrix}$

$= \left((9)(25) - 16^2\right) - 4\left((4)(25) - (9)(16)\right) + 9\left((4)(16) - 9^2\right)$

$= (225 - 256) - 4(100 - 144) + 9(64 - 81)$

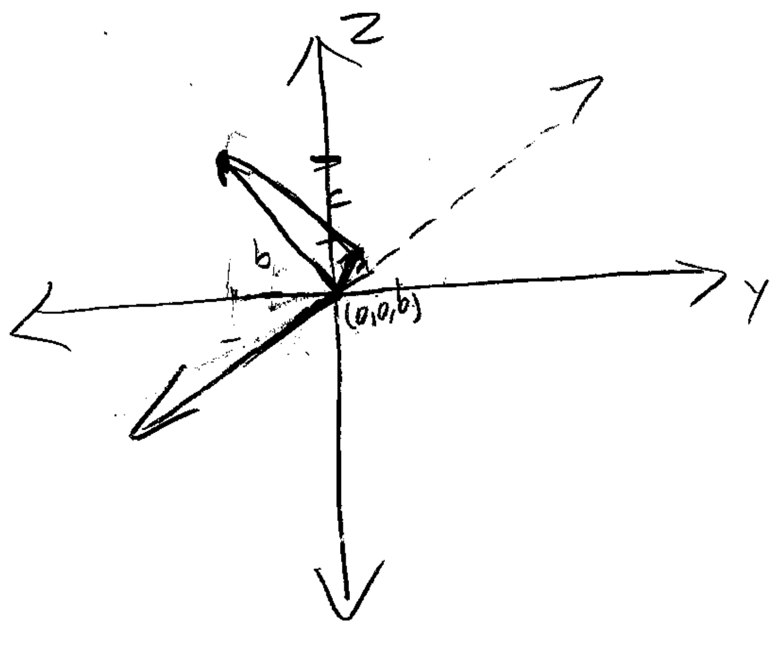
$= (-31) + 4(44) - 9(17) = -8$

4) $\vec{a} = \hat{i} - 2\hat{j} + \hat{k}$; $\vec{b} = 2\hat{i} + \hat{j} + \hat{k}$; $\vec{c} = 3\hat{i} - \hat{j} + 2k$

$\vec{a} \cdot (\vec{b} \times \vec{c}) = \vec{a} \cdot \begin{vmatrix} i & j & k \\ 2 & 1 & 1 \\ 3 & -1 & 2 \end{vmatrix} = \vec{a} \cdot \left(3\hat{i} - \hat{j} - 5\hat{k}\right)$

$= 3 + 2 - 5 = 0$

6)



The area of the triangle is equal to one half the area of a parallelogram spanned by the same vectors.

$\vec{a} = \langle 1,1,1 \rangle$

$\vec{b} = \langle 0,-2,3 \rangle$

$\vec{a} \times \vec{b} = (3+2)i - (3)j + (-2)k = 5i - 3j - 2k$

$\frac{1}{2} ||a \times b|| = \frac{1}{2}\sqrt{25+9+4} = \frac{1}{2}\sqrt{38}$

15a) $\vec{v} = (1,1,1)$ is normal to plane passing through $(1,0,0)$:

$(x-1) + (y) + (z) = 0$