1) $$\cos\theta = \frac{\bar{u}\cdot\bar{v}}{|u||v|} = \frac{-2+8-3}{\sqrt{14}\sqrt{21}}$$

$$\boxed{\theta = 74.92^\circ}$$

2) $$\begin{vmatrix} 0 & 1 & 1 \\ x & 3 & 0 \\ x & y & 1 \end{vmatrix} = (-x) + xy - 3x = 0$$

$$x(y-4) = 0$$

$$\boxed{x=0} \quad \boxed{y=4}$$

3) $$\alpha = \cos^{-1}\left(\frac{1}{|A|}\right) = 74.50$$

$$\beta = \cos^{-1}\left(\frac{1}{|A|}\right) = 57.70$$

$$\gamma = \cos^{-1}\left(\frac{3}{|A|}\right) = 36.70$$

4) $AB = (6, 2, 3)$

$AC = (2, -2, 1)$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 6 & 2 & 3 \\ 2 & -2 & 1 \end{vmatrix} = +8\hat{i} + 16\hat{k}$$

$$\sqrt{64+256} = 8\sqrt{5}/2 \quad \text{o} \quad \boxed{4\sqrt{5}}$$

5) $\begin{vmatrix} 1 & 2 & 3 \\ -3 & 1 & 4 \\ 1 & 2 & 1 \end{vmatrix} = 1(+7) - 2(-7) + 3(-7)$

$= -7(2) = |-14| = \underline{14}$

6) $\begin{vmatrix} 2 & -1 & 3 \\ 0 & 2 & -5 \\ 1 & -1 & -2 \end{vmatrix} = 2(-9) + 5 + 3(-2) = \underline{-19}$

7) $\bar{U} \times \bar{V} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -4 & 1 \\ 2 & 3 & 0 \end{vmatrix} = -3\hat{i} + 2\hat{j} + 11\hat{k} = \frac{-3, 2, 11}{\sqrt{134}}$

$\vec{u} = -0.26\hat{i} + 0.17\hat{j} + 0.95\hat{k}$

8) $\alpha = \cos^{-1}\left(\frac{2 + 12 + 6}{3 \cdot 7}\right) = \underline{17.75°}$

9) $\bar{C} = \frac{(5,0,0) + 3(-1,2,2)}{2} \times (5,0,0)$

$\bar{C} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1,3 & 3 & \\ 5,0 & 0 & \end{vmatrix} = 0 + 15\hat{j} - 15\hat{k} = \underline{15(\hat{j} - \hat{k})}$

10) $AB = (1, -6, 4)$

$AC = (-1, -1, 0)$

$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -6 & 4 \\ -1 & -1 & 0 \end{vmatrix} = 4\hat{i} - 4\hat{j} + 7\hat{k}$

$\sqrt{16 + 16 + 49} = 9 \rightarrow$ Area $= 4,5$