9C Scalar Products & Angles Between Lines

1. Given that $a = \begin{pmatrix} 8 \\ -5 \\ -4 \end{pmatrix}$ and $b = \begin{pmatrix} 5 \\ 4 \\ -1 \end{pmatrix}$.

a) Find $a.b$

b) Find the angle between a and b, giving your answer in degrees to 1 decimal place

2. Given that the vectors $a = 2i - 6j + k$ and $b = 5i + 2j + \lambda k$ are perpendicular, find the value of λ.

3. Given that $a = -2i + 5j - 4k$ and $b = 4i - 8j + 5k$, find a vector which is perpendicular to both a and b.

4. The points A, B and C have coordinates $(2, -1, 1)$, $(5, 1, 7)$ and $(6, -3, 1)$ respectively.

a) Find $\overrightarrow{AB}.\overrightarrow{AC}$

b) Hence, or otherwise, find the area of triangle ABC