Problem 1

The rank is 2. Use Gaussian elimination to get

$$\begin{bmatrix} 1 & 1 & 2 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

There are 2 linearly independent rows.

Problem 2

$$Ax = 5x + b$$
$$x(A - 5) = b$$
$$x = \frac{b}{A - 5}$$

Problem 3

Use the product rule to get $-A^T(y - Ax) - A(y - Ax)^T$

Problem 4

Answer b. Use Bayes Rule to get $P(H|E_1, E_2) = \frac{P(E_1,E_2|H)P(H)}{P(E_1,E_2)}$