1. Dimensions of matrix A: $p \times q$

2. Yes.

Conditions:

1. Dimensionality reduction preserves ~~at least two dimens~~ the 0 common dimensions in vectors p and q.
2. the points in the original vector had 0-valued destructive dimension values.
3. Eg:

$(1, 2, 0) | (2, 4, 0) \rightarrow (1, 2)(2, 4)$

using A to reduce originality eliminating the 2 axis.

3. a) $q = 2$, $p = 2$.

Original: $(1, 2)$; $(3, 4)$

$A = I_2$

New: $(1, 2)$; $(3, 4)$

b) $q = 2$, $p = 1$

Original: $(3, 5)$; $(1; 5)$

New: (3), (1)

A: $\begin{bmatrix} 1 & 0 \end{bmatrix}$

c) $q = 4$ $p = 2$

Original: $(1, 4, 7, 3)$; $(7, 4, 7, 6)$

New: $(1, 3)$; $(7, 6)$

A: $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$