Math 2210-002/010 Quiz 3   **Name:** _____   **Due:** 2/18/19
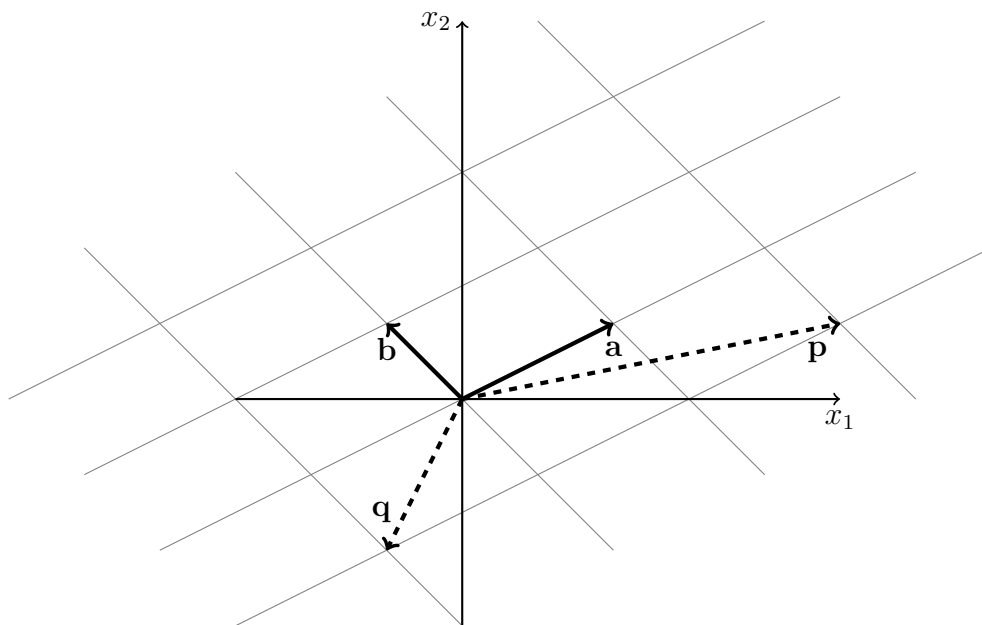
This is a two-stage quiz. You will receive this back with each question graded pass/fail in our next class meeting. You have until the date specified above to submit corrections for partial credit.

1. (4 points) The vectors $\mathbf{a}$, $\mathbf{b}$, $\mathbf{p}$ and $\mathbf{q}$ from $\mathbb{R}^2$ are graphed below. Note that $\mathbf{p}$ and $\mathbf{q}$ are in $\mathrm{Span}\{\mathbf{a}, \mathbf{b}\}$.

   (i) (2 points) Based on the figure above, express $\mathbf{p}$ as a linear combination of $\mathbf{a}$ and $\mathbf{b}$.

   (ii) (2 points) Based on the figure above, express $\mathbf{q}$ as a linear combination of $\mathbf{a}$ and $\mathbf{b}$.

2. (6 points) Consider the coefficient matrix

$$A = \begin{bmatrix} 1 & 2 & -1 \\ -2 & -4 & 3 \\ -1 & -2 & 7 \end{bmatrix}$$

(i) (2 points) Give the reduced echelon form of A.

(ii) (2 points) Let $\mathbf{b}$ be any vector in $\mathbb{R}^3$. Does the equation $A\mathbf{x} = \mathbf{b}$ necessarily have a solution? Justify your answer.

(iii) (2 points) Is there a nontrivial solution to the equation $A\mathbf{x} = \mathbf{0}$? Justify your answer.