

This quiz is worth 10 points.

Name: _____

1. (6 points) Let $A = \begin{bmatrix} 1 & 2 \\ 0 & -1 \\ 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 1 \\ 4 & 2 \end{bmatrix}$. Evaluate each expression below or state that the expression is not defined.

(a) $2AB$

(b) $2BA$

(c) A^2

(d) AA^T

2. (4 points) Let C be an $m \times n$ matrix where $C_{ij} = \begin{cases} 1 & \text{student } i \text{ is in class } j \\ 0 & \text{student } i \text{ is not in class } j \end{cases}$. Thus, the m rows of matrix C represent m students and the n columns of C represent n classes.

(a) Let $A = CC^T$.

i. What are the dimensions of A ?

ii. Suppose $A_{34} = 2$. Write a sentence explaining what this means in terms of students and classes.

(b) Let $B = C^TC$.

i. What are the dimensions of B ?

ii. Suppose $B_{34} = 2$. Write a sentence explaining what this means in terms of students and classes.