Quiz 9 Matrix operations.

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You are given matrices

$$A = \begin{bmatrix} 4 & 6 & 10 \\ 6 & 9 & 15 \end{bmatrix}, \text{ and } B = \begin{bmatrix} 1 & 0 \\ -3/2 & 1 \end{bmatrix}$$

Calculate the indicated matrix multiplications, or explain why they are not defined.

1. BA. **Answer:** $BA = \begin{bmatrix} 4 & 6 & 10 \\ 0 & 0 & 0 \end{bmatrix}$.

2. $2B$. **Answer:** $2B = \begin{bmatrix} 2 & 0 \\ -3 & 2 \end{bmatrix}$.

3. B^2. **Answer:** $\begin{bmatrix} 1 & 0 \\ -3 & 1 \end{bmatrix}$.

4. A^2. **Answer:** Not defined since A is not a square matrix.

5. AB. **Answer:** Not defined since $colnum(A) \neq rownum(B)$.

6. For meditation Set $P = \begin{bmatrix} 1 & 0 \\ t & 1 \end{bmatrix}$, where t is a parameter. Calculate $P^2 - 2P + I_2$. Why does it not change with t? Can we learn to guess this? **Answer:** This is a prelude to the characteristic polynomial and the Cayley-Hamilton theorem!