Matrix Quiz 1 Applications Review

Find the following given A = $\begin{bmatrix} 4 & x & -2 \\ y & 1 & z \\ 6 & w & v \end{bmatrix}$, and B = $\begin{bmatrix} a & -4 & z \\ 5 & y & 3 \\ x & 0 & 8 \end{bmatrix}$. If a matrix operation is undefined, explain why. Show work!

1. Find A + B

2. 3B – A

3. AB

4. $\begin{bmatrix} 4c & 2-d & 5 \\ -3 & -1 & 2 \\ 0 & -10 & 15 \end{bmatrix} + \begin{bmatrix} 2c+5 & 4d & g \\ -3 & h & f-g \\ 0 & -4c & 15 \end{bmatrix}$

5. $\begin{bmatrix} x^2 & 4 \\ -2 & y^2 \end{bmatrix} - \begin{bmatrix} 9 & 5 \\ -2 & 5y \end{bmatrix}$

6. $\begin{bmatrix} x^2 & 4 \\ -2 & y^2 \end{bmatrix} \bullet \begin{bmatrix} 9 & 5 \\ -2 & 5y \end{bmatrix}$

7. $\begin{bmatrix} x^2 & 4 \\ -2 & y^2 \end{bmatrix} \bullet \begin{bmatrix} 4c & 2-d & 5 \\ -3 & -1 & 2 \\ 0 & -10 & 15 \end{bmatrix}$

8. If $A_{2x4} \bullet B_{4x1}$, what are the dimensions of the product?

9. Is the multiplication of matrices commutative? Show examples to prove, disprove, or both.

Show your work for each problem using matrix operations to solve the best way.

11.   A travel agent offers three different travel packages to Williamsburg, Virginia. Package A consists of 4 nights at a hotel, 3 passes to local attractions, and 5 meals. Package B consists of 3 nights at a hotel, 4 passes, and 7 meals. Package C consists of 5 nights at a hotel, 4 passes, and no meals. The agent can book a hotel room for $90 per night, get passes for $28 and provide meal vouchers at a local restaurant for $15 per meal. She wants to run an ad featuring the least expensive package. Which plan should she advertise? Explain your reasoning. Label the rows and columns of your matrices in your work.

12.   An ultimate frisbee team has to order jerseys, shorts, and hats. They have a budget of $1350 to spend on $50 jerseys, $20 shorts, and $15 hats. They want to buy 40 items in preparation for the oncoming season and must order as many jerseys as shorts and hats combined. How many of each item should they order? Write a system of equations to help you solve this problem.

13.   The math club holds a Fall and Spring candy sale for a fundraiser. Each individual bar of candy sold at the following prices: $1.00 (Trail Treats) $1.00 (Carob Chews) $0.50 (Fruit Clusters) $1.50 (Nut Bars). Last year, their sales totals each semester were:

Fall:	40	Trail Treats	Spring:	75	Trail Treats
	100	Carob Chews		108	Carob Chews
	0	Fruit Clusters		80	Fruit Clusters
	40	Nut Bars		65	Nut Bars

   Label the rows and columns of your matrices in your work.
       (a) What is the total revenue from last Fall?   Last Spring?

       (b) If the club made a 40% profit last Fall and a 50% profit last Spring, what was their yearly profit?

14. Barrett's bookstore sells pencils for $0.10 each and erasers for $0.15 each. Last Tuesday, the store sold 17 more pencils than erasers for a total of $23.45. How many of each item was sold?

15. You are designing a plumbing system for a new office building. Three pipes, A, B, and C enter the building from the main water line. The total flow in all three pipes is 100 gal/min. If pipes B and C together carry 40 gal/min, and pipe A carries twice as much water as pipe B, how much water must flow in each pipe?