

⚠ Try again once you are ready

Grade received **60%** To pass 80% or higher

Try again

1. Let two matrices be

1 / 1 point

$$A = \begin{bmatrix} 1 & -4 \\ -2 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} 0 & 3 \\ 5 & 8 \end{bmatrix}$$

What is  $A + B$ ?

☐  $\begin{bmatrix} 1 & -1 \\ 7 & 9 \end{bmatrix}$

☐  $\begin{bmatrix} 1 & -7 \\ -7 & -7 \end{bmatrix}$

☐  $\begin{bmatrix} 1 & 7 \\ 7 & 9 \end{bmatrix}$

☒  $\begin{bmatrix} 1 & -1 \\ 3 & 9 \end{bmatrix}$

✓ Correct

To add two matrices, add them element-wise.

2. Let  $x = \begin{bmatrix} 2 \\ 7 \\ 4 \\ 1 \end{bmatrix}$

1 / 1 point

What is  $3 * x$ ?

☐  $\begin{bmatrix} \frac{2}{3} & \frac{7}{3} & \frac{4}{3} & \frac{1}{3} \end{bmatrix}$

☐  $\begin{bmatrix} 2 \\ 7 \\ 4 \\ 1 \\ 3 \end{bmatrix}$

☒  $\begin{bmatrix} 6 \\ 21 \end{bmatrix}$

☐  $\begin{bmatrix} 6 & 21 & 12 & 3 \end{bmatrix}$

✓ Correct

To multiply the vector  $x$  by 3, take each element of  $x$  and multiply that element by 3.

3. Let  $u$  be a 3-dimensional vector, where specifically

1 / 1 point

$$u = \begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$$

What is  $u^T$ ?

☐  $\begin{bmatrix} 4 \\ 1 \\ 8 \end{bmatrix}$

☐  $\begin{bmatrix} 8 \\ 8 \end{bmatrix}$

☐  $\begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$

☐  $\begin{bmatrix} 4 & 1 & 8 \end{bmatrix}$

☒  $\begin{bmatrix} 8 & 1 & 4 \end{bmatrix}$

✓ Correct

4. Let  $u$  and  $v$  be 3-dimensional vectors, where specifically

0 / 1 point

$$u = \begin{bmatrix} -3 \\ 4 \\ 3 \end{bmatrix}$$

and

$$v = \begin{bmatrix} 3 \\ 1 \\ 5 \end{bmatrix}$$

What is  $u^T v$ ?

(Hint:  $u^T$  is a

1x3 dimensional matrix, and  $v$  can also be seen as a 3x1

matrix. The answer you want can be obtained by taking

the matrix product of  $u^T$  and  $v$ .) Do not add brackets to your answer.

-4

✗ Incorrect

5. Let  $A$  and  $B$  be 3x3 (square) matrices. Which of the following

0 / 1 point

must necessarily hold true? Check all that apply.

✓ If  $C = A * B$ , then  $C$  is a 6x6 matrix.

✗ This should not be selected

Since  $A$  and  $B$  are both 3x3 matrices, their product is 3x3. More generally, if  $A$  were an  $m \times n$  matrix, and  $B$  a  $n \times o$  matrix, then  $C$  would be  $m \times o$ . (In our example,  $m = n = o = 3$ .)

☐  $A * B = B * A$

☐  $A + B = B + A$

✓ If  $A$  is the 3x3 identity matrix, then  $A * B = B * A$

✓ Correct

Even though matrix multiplication is not commutative in general ( $A * B \neq B * A$  for general matrices  $A, B$ ), for the special case where  $A = I$ , we have  $A * B = I * B = B$ , and also  $B * A = B * I = B$ . So,  $A * B = B * A$ .