Warm-up

On Handout

$$A = \begin{bmatrix} 4 & -2 & 3 \\ 0 & 1 & -1 \end{bmatrix} \qquad B = \begin{bmatrix} 1 \\ -3 \\ 0 \end{bmatrix} \begin{pmatrix} 5 \\ 2 \\ -4 \end{pmatrix}$$

$$AB = \begin{bmatrix} \frac{10}{3} & \frac{4}{6} \end{bmatrix}$$

1. Record the dimensions of matrices A and B.

The order of A is:
$$2\times3$$
 The order of B is: 3×2

2. Using red, circle the first row of A and first column of B. What do you notice about the number of elements in this row and in this column?

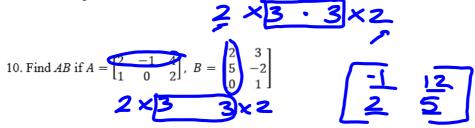
3. Multiply each element in the first row of A by the corresponding element (first, second, or third) in the first column of B, and add the products. Write your result below.

$$4() + (-2)(-3) + 3() =$$

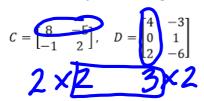
- 4. The result from #3 is the element in the first row and first column of the product AB. Using red, write this element in its place in the space provided for AB.
- 5. Using blue, circle the first row of A and the second column of B. Multiply corresponding elements and add the products. Write the result in the first row, second column of AB.
- 6. Using green, circle the second row of A and the first column of B. Multiply corresponding elements and add the products. Write the result in the second row, first column of AB.
- 7. Using orange, circle the second *row* of A and the second *column* of B. Multiply corresponding elements and add the products. Write the result in the second row, second column of AB.
- 8. What are the dimensions of AB? $\frac{1}{2} \times \frac{2}{3}$

Conclusions:

9. What is the same about the dimensions of A and B? What is different about the dimensions? What is the relationship between the dimensions of A and B and the dimensions of AB?



11. Using red, circle the first row of C and the first column of D. Do they have the same number of elements? Do you think the product CD is defined? Explain.



of columns in C + # of rows in D.

12. Complete the statement: The product of two matrices A and B is defined provided that the number of in A is equal to the number of in B.

13. Complete the statement: If A is an $m \times n$ matrix and B is an $n \times p$ matrix, then the product AB is an $n \times n$ matrix.

Try it:

State whether the product CD is defined. If so, give the dimensions of CD.

16. In #14, would the product of DC be defined? Why or why not?

17. In #15, would the product of DC be defined? Why or why not?

$$2x\overline{3 \cdot 3}x4$$

of columns in $D = \#$ of rows in C .