Classwork CPE 490 590

Date:

Student Name: _____

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① Identify which one is a column vector and which one is a row vector:

(2 Points)

$\vec{x} = \begin{bmatrix} 1 \\ 4 \\ 5 \end{bmatrix}$ $\vec{y} = [1, 4, 5]$

Ans: row vector

Ans: Column vector.

② Following are syntax for row and column vectors in Python using numpy.

```
>>A=np.array([[1,2,3]])    # How many number of columns?
>>B=np.array([[1],[2],[3]]) # How many number of rows?
```

which one of the above is a row vector and which one is a column vector? (2 points)

Ans: A is a row vector with 3 columns.

B is a column vector with 3 rows

③ In python

```
>> v = np.array([4,5,6])
>> w= np.array([10,20,30])
>> vplusw = v+w
```

What is the value of vplusw? (2 points)

Ans: np.array([14,25,36])

④ What is the output of a+b where: (2 points)

```
>> a= np.array([[ 0, 0, 0],
                [10,10,10],
                [20,20,20],
                [30,30,30]])

>> b = np.array([1,2,3])

>> a+b
```

Ans: np.array([[1, 2, 3],
[11,12,13],
[21,22,23],
[31,32,33]])

⑤ Matrix multiplication (4 points)

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}_{3\times3} \qquad B = \begin{bmatrix} 3 \\ 6 \\ 7 \end{bmatrix}_{3\times1}$$

Compute AxB. What kind of matrix is A?

Solution

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} 3 \\ 6 \\ 7 \end{bmatrix}$$

$$= \begin{bmatrix} 1\times3 + 0\times6 + 0\times7 \\ 0\times3 + 1\times6 + 0\times7 \\ 0\times3 + 0\times6 + 1\times7 \end{bmatrix} = \begin{bmatrix} 3 \\ 6 \\ 7 \end{bmatrix}$$