Quiz 2 (linear algebra, numpy, week2)

Due Apr 9 at 11:59pm **Points** 5 **Questions** 10 **Time Limit** None
Allowed Attempts 2

Take the Quiz Again

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	16 minutes	4.5 out of 5

ⓘ Answers will be shown after your last attempt

Score for this attempt: **4.5** out of 5
Submitted Apr 9 at 7:54am
This attempt took 16 minutes.

Question 1 — 0.5 / 0.5 pts

Geometrically, what does 2x2 matrix $A = \begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix}$ do to a vector $\mathbf{v} = \begin{pmatrix} x \\ y \end{pmatrix}$ in $A\mathbf{v}$? You can try with a few vectors to get the idea.

- (●) double x, maintain y
- ( ) double y, maintain x
- ( ) rotate the vector clockwise by 90 degrees
- ( ) rotate the vector counterclockwise by 90 degrees
- ( ) double x, double y

rrect

Question 2

0 / 0.5 pts

Based on the above geometric observation, which of the following vectors are eigenvectors of matrix A? Recall that a vector $\mathbf{v}$ is said to be an eigenvector of A if there is a scalar λ such that $A\mathbf{v} = \lambda\mathbf{v}$; geometrically, it basically says $A\mathbf{v}$ only "stretches" $\mathbf{v}$ by λ fold but does not rotate $\mathbf{v}$. Consider all vectors in the answers column vectors (Canvas does not allow LaTeX in the answers).

- [ ] (0, -1)
- [ ] (0, 1)
- [x] (2, 1)
- [ ] (2, 0)
- [ ] (-2, 0)
- [ ] (1, 2)

Question 3

0.5 / 0.5 pts

If

x = np.arange(3)

y = range(3)

Is x+x same as y+y?

- ( ) Yes, exactly the same

Almost the same, but of different types (x+x returns a numpy array but y+y returns Python list)

Different: x+x is concatenation, and y+y is element-wise addition

Different: x+x is element-wise addition, and y+y is concatenation

Question 4

0.5 / 0.5 pts

If x = np.array([1,2,3]), how do you concatenate x and x to np.array([1,2,3,1,2,3])?

- [x] np.concatenate([x, x], axis=0)
- [ ] x * 2
- [ ] x + x
- [ ] np.concatenate([x, x], axis=1)
- [x] np.concatenate([x, x])

Question 5

0.5 / 0.5 pts

If x = np.array([[1,2,3],

[4,5,6]]),

and y = np.array([1,2,3]).

Then x - y = ?

- [x] array([[0, 0, 0], [3, 3, 3]])
- [ ] Illegal operation
- [ ] array([[1 2 3], [3 3 3]])
- [ ] array([[0, 0, 0], [4, 5, 6]])

Question 6

0.5 / 0.5 pts

If x = np.array([[3,4], [5,12]])

What is the result of np.linalg.norm(x)?

- [ ] 16.0
- [ ] array([7., 17.])
- [ ] array([5., 13.])
- [x] 13.92838827718412

Question 7

0.5 / 0.5 pts

If x = np.array([[3,4], [5,12]])

What is the result of np.linalg.norm(x,axis=1)?

Hint: please refer to the topic "Euclidean vs. Manhattan Distances" in week one's slide.

- (●) array([5., 13.])
- ( ) 13.92838827718412
- ( ) array([7., 17.])
- ( ) 16.0

Question 8

0.5 / 0.5 pts

If x = np.array([[3,4], [5,12]])

What is the result of np.linalg.norm(x,axis=1,ord=1)?

- ( ) array([4., 12.])
- ( ) array([5., 13.])
- (●) array([7., 17.])
- ( ) 13.92838827718412

Question 9

0.5 / 0.5 pts

If x = np.array([3,4,1,5,12])

What is the result of x[x>=4] ?

Hint: conditional slicing

- array([False, True, False, True, True])
- array([4, 5, 12])
- True
- Illegal operation

Question 10

0.5 / 0.5 pts

If A = np.array([[1, 2],

[3, 4]]),

and v = np.array([2, -1]).

Then what are the results of A.dot(v) and A * v ?

- 2 and array([0, 2])
- array([0, 2]) and array([[2, -2], [6, -4]])
- illegal operation: A * v

Quiz Score: **4.5** out of 5