AMATH 1201 Winter 2022 Midterm Python Solutions:

17. A)

2^3 * cos(0)

= 8.0 * cos(0)

= 8.0 * 1

= 8.0

Remember that Python still follows order of operations. First the exponent (2 ** 3) is executed. Then python calculated cos(0). When multiplied together the result is 8.0.

18. D)

np.linspace(start, stop, num) creates a domain in the range of [start, stop] (meaning from the number "start" to the number "stop" including both the start and stop numbers). The number "num" defines the number of indexes we will have in our array. In our example we define np.linspace(-3,3 , 100) starts at -3 and goes to 3, with 100 indexes. We can see that 99 is our LAST index (remember we index from 0, so if you want the 100^{th} index you call x[100 - 1] = x[99]). Our last index is our "stop" parameter. Therefore, the result is 3.0.

19. B)

We go through this loop 2 times. However, for our purposed we only actually care about the last iteration of the loop, since we keep redefining a ("writing over a") during each iteration. At the last iteration we can see our "i" value is set to 1 (range(2) -> [0, **1**]), and our a variable is declared as:

a = i + 2

a = 1 + 2

a = 3

20. D)

None of these solutions are true. The correct implementation is Eq(-u.diff(t) + u, 0). We must remember that all our signs are correct. The first parameter in Eq is the LHS of the equation and the second is the RHS of the equation.

AMATH 1201 Winter 2022 Make-Up Midterm Python Solutions:

16. D)

3 * 2 ^ (cos(pi))

= 3 * 2 ^ (-1)

= 3 * 0.5

= 1.5

Remember that Python still follows order of operations. First the cos(pi) is executed, and -1 is the result. 2^(-1) is the same as 0.5 or one half. Multiply that by 3 and you have your solution

17. B)

np.linspace(start, stop, num) creates a domain in the range of [start, stop] (meaning from the number "start" to the number "stop" including both the start and stop numbers). The number "num" defines the number of indexes we will have in our array. In our example we define np.linspace(-5, 5, 99) starts at -5 and goes to 5, with 99 indexes. We can see the 49^{th} index is right in the middle of -5 and 5. Will be 49 number to the left of index 49 and 49 to the right. Since it is in the middle of -5 and 5, the solution is 0.0.

18. E)

We go through this loop 3 times. However, for our purposed we only actually care about the last iteration of the loop, since we keep redefining a ("writing over a") during each iteration. At the last iteration we can see our "i" value is set to 2 (range(3) -> [0, 1, **2**]), and our a variable is declared as:

a = i + 3

a = 2 + 3

a = 5

19. D)

None of these solutions are true. The correct implementation is Eq(-u.diff(t) + u, 0). We must remember that all our signs are correct. The first parameter in Eq is the LHS of the equation and the second is the RHS of the equation.