HW 07 - turn in one week from today in Canvas

Turn in the 3 questions as a single .py file onto canvas. Use comments to clearly indicate which question you are working on. Your filename should end as _py2.py if you use Python2 and _py3.py if you use Python3.

1. a = np.array([0.5507979 , 0.70814782, 0.29090474, 0.51082761, 0.89294695, 0.89629309, 0.12558531, 0.20724288, 0.0514672 , 0.44080984]); b = np.array([-0.04381817, -0.47721803, -1.31386475, 0.88462238, 0.88131804, 1.70957306, 0.05003364, -0.40467741, -0.54535995, -1.54647732]) Do these two sets of samples come from the same distribution?

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2. A new plan to launch people from Earth to Mars claims to have 9.25 % chance of mission failure. Assume the chance of one mission failing is entirely independent of other missions failing. We can afford only 100 mission attempts. Use a binomial distribution to simulate the 100 missions 10 times with a random seed of 121 (binom.rvs with $n = 100$, $p = 0.0925$.) Each number in the array will detail the number of failures out of the 100 missions. Print the mean number of failures from your 10 simulations. What is the probability that we'll have at most 10 number of failures? (Take your_binom.cdf(10.0)). Print the probability.

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3. I've attached (lectures07 folder) a numpy array containing the stiffness modulus (in GPa) of 1000 different Aluminum alloys. I suspect the various stiffness moduli follow either the normal, laplace, maxwell, or the logistic distributions. I want you to tell me what distribution do you think the stiffness moduli follow. Your script should contain print('norm'), print('laplace'), print('maxwell'), or print('logistic') to tell me which distribution you believe the stiffness moduli follow. I'm happy for you to tell me more than one possible distribution.

Hint: Use kstest to eliminate choices! This can be done qualitatively. Fit parameters for each of the four distributions. Plot the PDF of each distribution and compare them with the normed histogram of the samples (do this on one plot). Plot the CDF of each distribution and compare them with the cumulative normed histogram of the samples. You should be able to easily rule out two of the four distributions. Either of the two plausible distributions are acceptable answers.