Homework 1

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1.

a. Sample space is the set of all combinations of 10 dices

b. 6^{10} outcomes, because each dice has 6 outcomes and there're 10 dices

c. P = $(1/6)^7 \ * \ (5/6)^3 \ * \ C_{10}^3$ = 0.000248

d. Assume that each coin has the probability of p' to remain on the table, while 1-p' to fall (either onto chair or floor). Also assume that "no coin fell" could happen. Thus, the probability that all 7 sixes remained on the Table is:

$$P = p'^7$$

2.

a. P = 0.5 * 0.5 * 0.5 = 0.125

b. Ω = {<FMM>, <FFM>, <FMF>, <MFM>, <MMF>, <MFF>, <FFF>}

So, P = 1/7

c. Ω = {<FMM>, <FFM>, <FMF>, <FFF>}

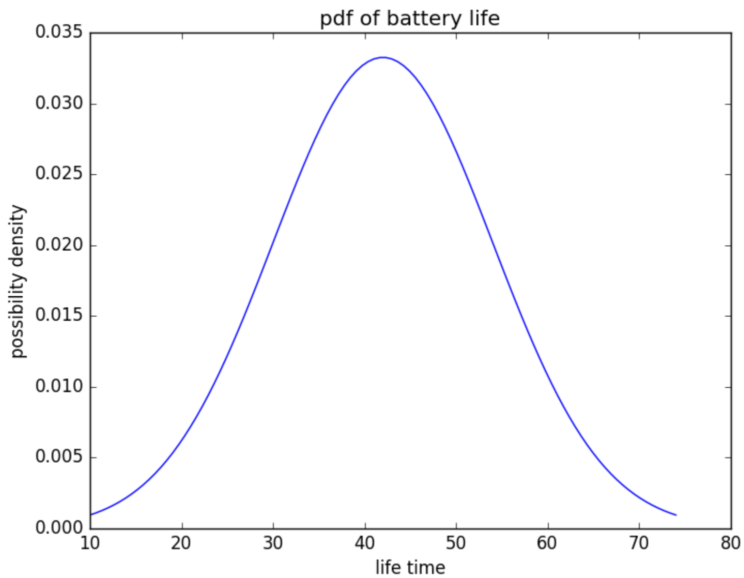
So, P = 1/4

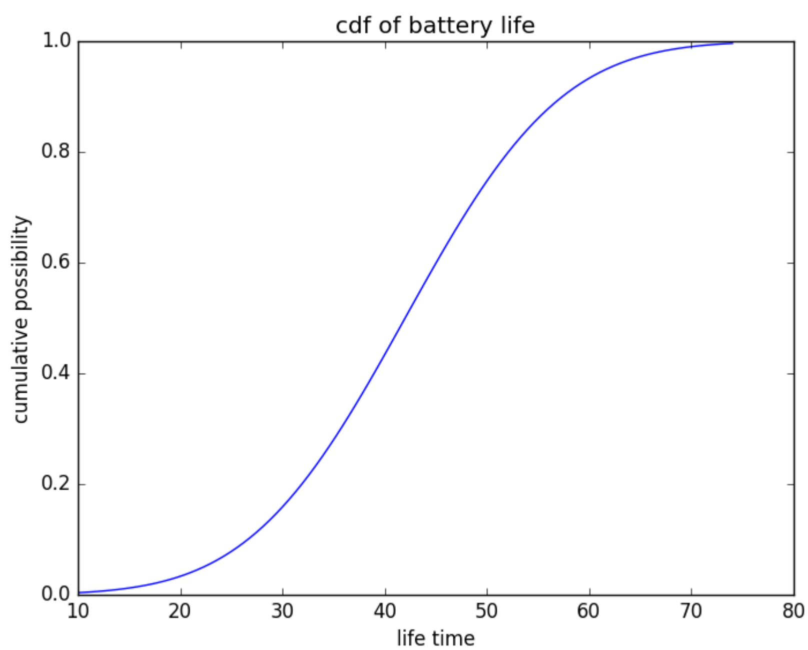
d. 1/3

e. now the probability of guessing oldest and youngest is both ½

3. (the whole answer is based on that whether my phone die or not at present is unknown)

a.





b. P = F(40.5) = 0.453

c. P = F(44.5) – F(40.5) = 0.584 – 0.453 = 0.131

d. F(22.3) = 0.05, but I already used it for 36 hours…I'm lost

4.

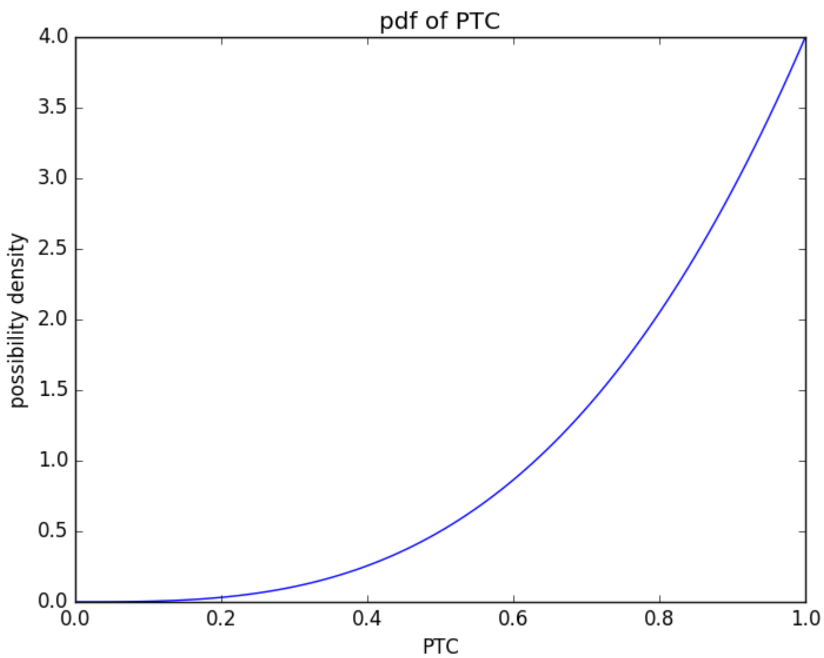
a. continuous. Because the sample space has infinite outcomes.

b.. 1

c.. $\int_0^1 Cx^3$ = C$\int_0^1 x^3$ = C/4 =1

So, C = 4

d..



e. Probability for one coordinate to fall into the damaged areas is:

$$P0 = \int_0^{0.3} 4x^3 = 0.0081$$

So, the probability of 4 coordinates having at least one in damaged areas is:

$$P = 1 - (1 - P0)^4 = 0.032$$

f. The probability of PTC > 0.8:

$$P1 = \int_{0.8}^{1} 4x^3 = 0.5904$$

Assume that we only consider this 4 neighboring squares, and ignore the other surrounding squares; also assume that one only affects its next one, not the previous one; if one is not flourishing, the next flourishing or not will be decided by P1 = 0.5904.

Then, the probability should be:

P = P1 * 0.98 * 0.98 * 0.98 + P1 * 0.98 * 0.02 * (1 – P1) + P1 * 0.02 * P1 * 0.98 + P1 * 0.02 * (1 – P1) * P1 + (1 – P1) * P1 * 0.98 * 0.98 + (1 – P1) * P1 * 0.02 * P1 + (1 – P1) * (1 –P1) * P1 * 0.98 + (1 – P1) * (1 – P1) * (1 – P1) * P1