AP Statistics Practice Free Response - ANSWERS Chapters 7 and 8

1. Patients receiving artificial knees often experience pain after surgery. The pain is measured on a subjective scale with possible values of 1 to 5. Assume that X is a random variable representing the pain score for a randomly elected patient. The following table gives part of the probability distribution for X.

X	1	2	3	4	5
P(X)	.1	.2	.3	.3	

(a) Find P(X = 5). **1 – (.1 + .2 + .3 +.3) = 1 - .9 = .1**

(b) Find the probability that the pain score is less than 3. **P(x<3) = .1 + .2 = .3**

(c) Find the probability that the pain score is greater than 3. **P(x>3) = .3 + .1 = .4**

(d) Find the mean μ for this distribution. **$\mu = \Sigma x_i p_i$ = 1(.1) + 2(.2) + 3(.3) + 4(.3) + 5(.1) = 3.1**

2. Amarillo Slim, a professional dart player, has an 80% chance of hitting the *bull's-eye* on a dartboard with any throw. Suppose that he throws 10 darts, one at a time, at the dartboard.

(a) Find the probability that Slim hits the bull's-eye exactly six times. **binompdf(10, .8, 6) = .088**

(b) Find the probability that he hits the bull's-eye at least four times. **1-binomcdf(10, .8, 3) = .999**

(c) Compute the expected number of bull's-eyes in 10 throws. **μ = np = 10(.8) = 8**

(d) Find the probability that Slim's first bull's-eye occurs on the fourth throw.

geometpdf(.8, 4) = .0064

(e) Find the probability that it takes Amarillo more than 2 throws to hit the bullseye.

P(x>2) = $(.2)^2$ = .04 OR 1 - geometcdf(.8, 2) = .04

3. Harlan comes to class one day, totally unprepared for a pop quiz consisting of ten multiple-choice questions. Each question has five answer choices, and Harlan answers each question randomly.

(a) Find the probability that Harlan's gets more than 5 questions right out of 10.

P(x>5) = 1 – binomcdf(10, .2, 5) = .0064

(b) Find the probability that Harlan's first correct answer occurs after the fourth question.

P(x>4) = $(.8)^4$ = .4096 OR 1 - geometcdf(.2, 4) = .4096

(c) Find the expected number of questions required for Harlan to get his first correct answer.

μ = 1 / p = 1 / .2 = 5

(d) Find the probability that Harlan guesses more answers correctly than would be expected by chance. **Since μ = np = 10(.2) = 2: P(x>2) = $(.8)^2$ = .64 OR 1 - geometcdf(.2, 2) = .64**