

AP Statistics Practice Free Response

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 $P(X = 5)$.
- (b) Find the probability that the pain score is less than 3.
- (c) Find the probability that the pain score is greater than 3.
- (d) Find the mean μ for this distribution.
2. A quarterback completes 44% of his passes.
- (a) What is the probability that the quarterback throws 3 incomplete passes before he has a completion?
- (b) What is the probability that the quarterback throws his first completion in no more than 3 attempts?
- (c) How many passes, on average, can the quarterback expect to throw before he completes his first pass?
- (d) Use two methods to determine the probability that it takes more than 5 attempts before he completes a pass.
3. A headache remedy is said to be 85% effective in curing headaches caused by simple nervous tension. An investigator tests this remedy on 8 randomly selected patients suffering from nervous tension.
- (a) Find the probability that the remedy works for 7 of the patients.
- (b) Find the probability that the remedy works for more than 6 of the patients.
- (c) Find the probability that the remedy works for less than half of the patients.
- (d) What is the expected value for the number of people in the experiment who have success with the remedy?

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 . **DISCRETE RANDOM VARIABLE**

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

- (a) $1 - (.1 + .2 + .3 + .3) = 1 - .9 = .1$.
- (b) $.1 + .2 = .3$.
- (c) $.3 + .1 = .4$.
- (d) $\mu = 1(.1) + 2(.2) + 3(.3) + 4(.3) + 5(.1) = 3.1$.
2. A quarterback completes 44% of his passes. **GEOMETRIC**
- (a) $P(x = 4) = (.56)^3(.44) = .078$
- (b) $P(x \leq 3) = \text{geometcdf}(.44, 3) = .824$
- (c) $\mu = \frac{1}{p} = \frac{1}{.44} = 2.273$
- (d) $P(x > 5) = (.56)^5 = .055$ OR $P(x > 5) = 1 - \text{geometcdf}(.44, 5) = .055$
3. A headache remedy is said to be 85% effective in curing headaches caused by simple nervous tension. An investigator tests this remedy on 8 randomly selected patients suffering from nervous tension. **BINOMIAL**
- (a) $P(x = 7) = \frac{8!}{7!1!} (.85)^7 (.15)^1 = .385$
- (b) $P(x > 6) = 1 - \text{binomcdf}(8, .85, 6) = .657$
- (c) $P(x < 4) = \text{binomcdf}(8, .85, 3) = .003$
- (d) $\mu = np = 8(.85) = 6.8$