

CP 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 takes 4 passes to get his first completion?
 - (b) What is the probability that the quarterback throws his first completion in 3 or fewer attempts?
 - (c) How many passes, on average, can the quarterback expect to throw before he completes his first 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?

ANSWERS - CP 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 . **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) $P(x \leq 3) = P(x = 1) + P(x = 2) + P(x = 3) =$
 $P(x = 1) = .44$, $P(x = 2) = (.56)(.44) = .246$, $P(x = 3) = (.56)^2(.44) = .138$
So, $P(x \leq 3) = .44 + .246 + .138 = .824$
- (c) $\mu = \frac{1}{p} = \frac{1}{.44} = 2.273$
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) $P(x > 6) = .657$ (using online binomial calculator)
- (c) $P(x < 4) = .003$ (using online binomial calculator)
- (d) $\mu = np = 8(.85) = 6.8$