

Math 1313
Test 4 Review

1. Let E and F be two events with $P(E) = 0.3$ and $P(F) = 0.2$ and $P(E \cup F) = 0.35$. Find:

a. $P(E | F)$

b. $P(F | E^c)$

2. Companies A, B, and C produce 10%, 40% and 50% respectively of a certain product. It has been found that 1 % from A , 1½ % from B and 2% from C are defective. One of these products is chosen at random.

a. Find the probability the product is defective.

b. Find the probability the product is defective and that it was produced by Company C.

c. Find the probability that it produced by Company C, given it was defective.

3. Urn 1 contains 30 blue and 20 green marbles. Urn 2 contains 20 blue and 25 green marbles. An urn is chosen at random with equally likely probability, then a marble is chosen.

a. What is the probability that the marble chosen was green?

b. What is the probability Urn 1 was chosen, given the marble was green?

4. The odds for rain tomorrow are 2:3. What is the probability it will not rain?

5. The probability of an event occurring is 0.4. What are the odds the event will occur?

6. A 45 point quiz was given to a history class. The scores are listed below with the corresponding probability. Find the average for this class.

X	P(X=x)
30	0.15
32	0.225
33	0.175
37	0.3
42	0.1

7. The following probability distribution has expected value of 6.7. Find the standard deviation.

X	P(X=x)
3	0.4
5	0.2
9	0.1
12	0.3

8. The heights of women who participated in a recent survey have a mean of 64 inches and a standard deviation of 2 inches. Use Chebychev's Inequality to estimate the probability that a woman chosen at random height will be between 60 and 68.

9. Consider the following binomial experiment. The probability that a person will get a cold this winter is 0.55. Ten people are chosen random.

a. Find the probability that is at least 9 people will get a cold.

b. Find the probability that is exactly 5 people will get a cold.

c. Find the probability that at least 2 people will get a cold.

d. Find the mean, variance and standard deviation of the experiment.

10. Let Z be a standard normal random variable. Find the following probabilities:

a. $P(Z < -1.47)$

b. $P(Z > -1.84)$

c. $P(1.1 < Z < 2.13)$

d. $P(Z < z) = 0.8264$

e. $P(Z > z) = 0.8665$

f. $P(-z < Z < z) = 0.8690$

11. The heights of a certain plant are normally distributive with a mean of 10 inches and a standard deviation of 2 inches. Find the probability that a plant selected at random measures between 8 and 12.

12. Use the normal distribution to approximate the binomial distribution. A marksman's chance of hitting a bulls-eye with each of his shots is 82%. If he fires 30 shots, what is the probability of his hitting the target fewer than 25 times?

Formulas to be Provided on Test 4 and the Z-table will also be provided.
They will be links.

$$P(E \cup F) = P(E) + P(F) - P(E \cap F)$$

$$P(A | B) = \frac{P(A \cap B)}{P(B)}$$

$$P(A \cap B) = P(B) \cdot P(A | B)$$

Given A and B are independent $P(A \cap B) = P(A) \cdot P(B)$

$$E(X) = x_1 p_1 + x_2 p_2 + \dots + x_n p_n$$

$$\frac{P(E)}{P(E^c)}$$

$$\frac{P(E^c)}{P(E)}$$

If the odds in favor of an event E occurring are a to b , then the probability of E occurring is

$$P(E) = \frac{a}{a+b}$$

$$Var(X) = p_1(x_1 - \mu)^2 + p_2(x_2 - \mu)^2 + \dots + p_n(x_n - \mu)^2$$

$$\sigma = \sqrt{Var(X)}$$

$$P(\mu - k\sigma \leq X \leq \mu + k\sigma) \geq 1 - \frac{1}{k^2}.$$

$$P(X = x) = C(n, x) p^x q^{n-x}$$

$$\mu = np$$

$$Var(X) = npq$$

$$\sigma = \sqrt{Var(X)}$$

$$P(X < b) = P\left(Z < \frac{b - \mu}{\sigma}\right)$$

$$P(X > a) = P\left(Z > \frac{a - \mu}{\sigma}\right)$$

$$P(a < X < b) = P\left(\frac{a - \mu}{\sigma} < Z < \frac{b - \mu}{\sigma}\right)$$

$$P(Z < z) = \frac{1}{2}[1 + P(-z < Z < z)]$$