

NAME: \_\_\_\_\_

1. A Times Orange County poll sampled votes from Orange County, California, whether a commercial airport should be built. Although the voters countywide believed an airport would benefit the local economy, the respondents remained deeply divided over building a county airport. The results of the poll are as follows:

	<i>Percentage (%)</i>
Favor building the airport	43
Undecided	13
Disfavor building the airport	44

Let the random variable  $X$  represent the following values:

$X$	<i>Category</i>
3	Favor building the airport
2	Undecided
1	Disfavor building the airport

- A.) Calculate the expected value for this discrete distribution.

**ANSWER:  $E(x) = 1.99$**

- B.) Calculate the variance for this discrete distribution.

**ANSWER:  $Var(x) = 0.8699$**

- C.) Calculate the standard deviation for this discrete distribution.

**ANSWER:  $Standard\ Deviation(x) = 0.9327$**

2. The following data are the result of a historic study of the number of flaws in a microchip produced by a manufacturing firm.

Flaws	Probability
0	.46
1	.29
2	.13
3	.08
4	.04

- A.) Calculate the expected number of flaws in the microchips.

**ANSWER:  $E(x) = 0.95$**

- B.) Calculate the standard deviation in the number of flaws in the microchips.

**ANSWER:  $Standard\ Deviation(x) = 1.1258$**

- C.) Calculate the probability that there will be 2 or fewer flaws in a randomly selected microchip.

**ANSWER:  $P(x \leq 2) = 0.88$  or 88%**

3. A market research team compiled the following discrete probability distribution. In this distribution X represents the number of automobiles owned by a family residing in Nueces County. The expected value of x is 1.8.

X	P(X)
0	0.10
1	0.30
2	0.30
3	0.30

Calculate the standard deviation of X for this discrete distribution \_\_\_\_\_.

**ANSWER:  $Standard\ Deviation(x) = 0.9798$**

4. A market research team compiled the following discrete probability distribution. In this distribution  $X$  represents the number of automobiles owned by a family residing in Starr County.

$X$	$P(X)$
0	0.10
1	0.10
2	0.50
3	0.30

What is the expected value of  $X$ ?

**ANSWER:  $E(x) = 2$**

5. Using historical records, the personnel manager of a plant has determined the probability distribution of  $x$ , the number of employees absent per day:

$x$	$P(x)$
0	0.005
1	0.025
2	0.31
3	0.34
4	0.22
5	0.08
6	0.019
7	0.001

Find the following probability:  $P(2 \leq x \leq 5)$ ?

**ANSWER:  $P(2 \leq x \leq 5) = 0.95$  or 95%**

6. A lawyer estimates that 40% of the cases in which he represented the defendant were won. If the lawyer is currently representing 10 defendants in different cases, what is the probability that at least 5 of the cases will be won?

**ANSWER: 0.367 or 36.7%**

7. A marketing research firm has discovered that 30% of the people who earn between \$25,000 and \$50,000 per year have bought a new car within the past 2 years. In a sample of 12 people earning between \$25,000 and \$50,000 per year, what is the probability that between 4 and 7 people, inclusive, have bought a new car within the past two years?

**ANSWER: 0.4979 or 49.79%**

8. The Professional Technician recommends stocks each month. If 35% of the stocks recommended experience high gains, what is the probability that of the five stocks recommended this month, no more than 2 will experience high gains?  
**ANSWER: 0.7648 or 76.48%**
9. The manager of a retail store knows that 10% of all checks written are “hot” checks. Of the next 18 checks that are written at the retail store, what is the probability that 4 of the checks are hot?  
**ANSWER: 0.0700 or 7%**
10. The manager of a retail store knows that 10% of all checks written are “hot” checks. If a sample of 52 checks is taken, what is the expected number of “hot” checks in the sample?  
**ANSWER:  $E(x) = 5.2$**
11. The manager of a retail store knows that 10% of all checks written are “hot” checks. If a sample of 24 checks is taken, what is the variance of “hot” checks in the sample?  
**ANSWER:  $\text{Var}(x) = 2.16$**
12. In the past few years outsourcing overseas has become more frequently used than ever before by U.S. companies. However, outsourcing is not without problems. A recent survey indicates that 20% of the companies that outsource use a consultant. Suppose 15 companies that outsource overseas are randomly selected.
- What is the probability that exactly 5 companies that outsource overseas use a consultant?  
**ANSWER: 0.1032 or 10.32%**
  - What is the probability that more than 9 companies that outsource overseas use a consultant?  
**ANSWER: 0.0001 or 0.01%**
  - What is the expected value of the companies that outsource overseas use a consultant?  
**ANSWER:  $E(x) = 3$**
  - What is the variance of the companies that outsource overseas use a consultant?  
**ANSWER:  $\text{Var}(x) = 2.4$**
  - What is the standard deviation of the companies that outsource overseas use a consultant?  
**ANSWER: standard deviation(x) = 1.5492**