

# Test 4 Review

Name: Key Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Know your Vocab!!!

Random Variable

Population Mean

Multinomial Distribution

Discrete Variable

Population Standard Deviation

Poisson Distribution

Continuous Variable

Expected Value

$\mu$   $\sigma$   $\lambda$

Probability Distribution

Binomial Distribution

## Section 1: Probability Distributions and Graphs

Determine whether the distribution represents a probability distribution. If not, state why.

1)

X	1	2	3	4	5
P(X)	$\frac{3}{10}$	$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{1}{10}$

yes!

2)

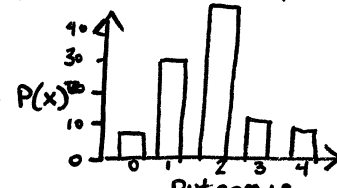
X	5	10	15	20
P(X)	0.7	0.3	0.1	-0.1

no; b/c -0.1 is not b/w 0 and 1

3) A study was conducted to determine the number of radios each household has. The data are shown here. Construct a probability distribution for the data and draw a graph.

Number of Radios	Frequency
0	5
1	30
2	45
3	12
4	8

X	0	1	2	3	4
P(x)	5%	30%	45%	12%	8%

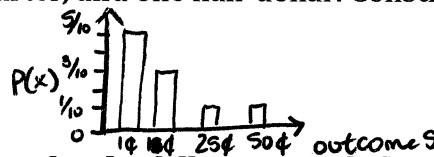


Total: 100

4) A box contains five pennies, three dimes, one quarter, and one half-dollar. Construct a probability distribution for the data and draw a graph.

total: 10

X	1¢	10¢	25¢	50¢
P(X)	$\frac{5}{10}$	$\frac{3}{10}$	$\frac{1}{10}$	$\frac{1}{10}$



## Section 2: Find the mean and standard deviation for the following probability distributions.

5) At a small community library, the number of visitors per hour during the day has the distribution shown. Find the mean and standard deviation.

X	8	9	10	11	12
P(X)	0.15	0.25	0.29	0.19	0.12

$$\mu = 9.88$$

$$\sigma = 1.23$$

6) The number of inquiries received per day for a college catalog is distributed as shown. Find the mean and standard deviation.

X	22	23	24	25	26	27
P(X)	0.08	0.19	0.36	0.25	0.07	0.05

$$\mu = 24.19$$

$$\sigma = 1.21$$

### Section 3: Expected Value.

Construct a probability distribution using net gain, and find the expected value.

7) A cash prize of \$5000 is to be awarded at a PTSA raffle. If 2500 tickets are sold at \$5 each, find the expected value of the gain.

Net Gain	-5	4995
P(x)	$\frac{2499}{2500}$	$\frac{1}{2500}$

$$E(x) = -3$$

8) A box contains ten \$1 bills, five \$2 bills, one \$10 bill, and one \$100 bill. A person is charged \$20 to select one bill. Find the expected value.

Net Gain	-19	-18	-10	80
P(x)	$\frac{10}{17}$	$\frac{5}{17}$	$\frac{1}{17}$	$\frac{1}{17}$

$$E(x) = -12.35$$

9) 700 raffle tickets are sold for \$1.50 each. A grand prize of \$600 will be selected at random. Find the expected value if you purchase four tickets.

Net Gain	-6	594
P(x)	$\frac{696}{700}$	$\frac{4}{700}$

$$E(x) = -2.57$$

### Section 4: Binomial Distribution

10) If 10% of the people who are given a certain drug experience dizziness, find these probabilities for a sample of 15 people who take the drug.

- a. Fewer than two people will become dizzy = .5490
- b. Exactly three people will become dizzy = .1285
- c. At most four people will become dizzy = .9873

11) If 20% of the people in a community use the emergency room at a hospital in one year, find the probability that at most three used the emergency room for a sample of 10 people.

$$.8791$$

### Section 5: Multinomial Distribution

12) The probabilities that a person will make 0, 1, 2, or 3 errors on an insurance claim are 0.70, 0.20, 0.08, and 0.02 respectively. If 20 claims are selected, find the probability that 12 will contain no errors, 4 will contain one error, 3 will contain 2 errors, and 1 will contain 3 errors.

$$.00799 = .0080$$

13) In a Christmas display, the probability that all lights are the same color is 0.50; that 2 colors used is 0.40; that 3 or more colors are used is 0.10. If a sample of 10 displays is selected, find the probability that 5 will have only one color of light, 3 will have two colors, and 2 will have three colors.

$$.1260$$

### Section 6: Poisson Distributions

14) If 4% of the population carries a certain genetic trait, find the probability that in a sample of 100 people, there are exactly 8 people who have the trait. Assume the distribution is approximately Poisson.

$$.0298$$

15) The number of boating accidents on Lake Hartwell follows a Poisson distribution. The probability of an accident is 0.003. If there are 1000 boats on the lake during a summer month, find the probability that there will be six accidents.

$$.0504$$

16) The number of road construction projects that take place at any one time in a certain city follows a Poisson distribution with a mean of 7. Find the probability that exactly four road construction projects are currently taking place in the city.

$$.0912$$