

Week in Review # 10

MATH 141

Drost-Spring 2010

Review for EXAM 3

Expected Value

1. The chef at the local Mexican restaurant recorded the weekly consumption of salsa over a 20 week period.

Qts Salsa	100	120	140	160	180	200
Weeks	1	2	5	5	4	3

a) Find the average weekly consumption of salsa at this restaurant.

b) Let X denote the number of quarts of salsa consumed in a week at the restaurant. Find the probability distribution of the random variable X and compute $E(X)$, the expected value of X .

2. If a sample of 4 batteries is selected from a lot of 20 batteries, of which 2 are defective, what is the expected number of defective batteries?
3. Solar Designs built a spec house at a cost of \$275,000. They estimate they can sell the house for \$400,000, \$425,000, or \$450,000 with probabilities of 0.30, 0.45, and 0.25, respectively. What is the expected profit for Solar Designs on this particular model?
4. Compare two car dealerships with the following weekly volume of sales, with corresponding probabilities:

All Star Autos

# Sold/Wk	4	5	6	7	8	9	10
Probability	.04	.12	.25	.30	.15	.10	.04

Best Car Deals

# Sold/Wk	4	5	6	7	8
Probability	.08	.13	.26	.35	.18

The average profit/car at *All Star Autos* is \$520, and the average profit/car at *Best Car Deals* is \$640.

a) Find the average number sold each week at each dealership.

b) Which dealership has the highest expected weekly profit?

5. Suppose the probability that it will rain tomorrow is 0.3.
- a) What are the odds that it will rain tomorrow?

b) What are the odds that it will **not** rain tomorrow?

6. The odds against an event E occurring are 4 to 5. What is the probability of E not occurring?

7. The following scores were earned on a recent multiple choice history exam given to 16 students.

65	75	50	95
80	95	100	35
40	75	60	85
60	95	55	70

Find the mean, mode, and median score on the exam.

Variance and Standard Deviation

8. Find the variance of the random variable X in problem number 4 above for *All Star Autos*.
9. Find the standard deviation of the random variable X for *All Star Autos*.
10. In a class of 100 students, define X as the random variable whose value represents the students grade in the finite math class, $A = 4, B = 3$, etc. Compute the mean, and standard deviation.

$X =$	4	3	2	1	0
freq. of occurrence	13	30	42	10	5

11. A probability distribution has a mean of 18 and a standard deviation of 1.3. Use Chebychev's inequality to find a bound on the probability that an outcome of the experiment lies between 14 and 22.

12. Find the variance of the probability distribution:

$X =$	1	2	3	4	5
$p(X) =$	0.1	0.3	0.3	0.2	0.1

13. The minimum age requirement for a regular driver's licence varies in each state.

Minimum Age	14	15	16	17	18
freq. of occurrence	2	7	39	1	1

Source: <http://www.2pass.co.wk/ages2.htm>

a) Describe a random variable X that is associated with this data.

b) Find the probability distribution for the random variable X .

c) Compute the mean, variance, and standard deviation of X .

14. The number of married men (in thousands) between the ages of 20 and 44 in the United States in 1998 is given in the following table:

Age	20-24	25-29	30-34	35-39	40-44
Men	1332	4219	6345	7598	7633

Find the mean and the standard deviation of the given data. Assume that all scores lying within a group interval take the middle value of that group. *Source: FINITE MATH, by Tan, p. 449, #24*

Binomial Distribution

15. A fair eight-sided die is rolled 2 times. If a 3 or a 5 lands uppermost in a trial, then the throw is considered a *success*. Otherwise, the throw is considered a *failure*.

a) Find the probability of obtaining exactly 0, 1, or 2 successes.

b) Construct a binomial distribution and draw a histogram.

c) What is the probability of obtaining 0 or 1 success in the experiment?

d) What is the probability of obtaining at least one success in the experiment?

e) Compute the mean, variance, and standard deviation of X .