

The following table gives the probability distribution for a random variable X Use this table for Problems 1, 2, and 3.

<u>k</u>	<u>Pr(X = k)</u>
-1	0.4
0	0.1
1	0.2
2	0.3

1. The probability that $X^2 = 1$ is:

- a. 0 b. 0.4 c. 0.6 d. 0.2 e. 0.08

2. The expected value $\mu = E(X)$ is:

- a. 0.3 b. 0.1 c. 0.2 d. 0.4 e. 0.5

3. The variance σ^2 is:

- a. 0 b. 1.64 c. 1.45 d. 1.91 e. 0.82

Use the following frequency distribution for Problems 4 and 5

value	0	2	4	7	13
frequencies	5	4	7	3	1

4. The relative frequency of the value 2 is:

- a. 0.3 b. 0.4 c. 4.0 d. 0.5 e. 0.2

5. The sample mean is:

- a. 4.5 b. 4 c. 3.5 d. 70 e. 3

6. Suppose a die is rolled and X denotes the number of spots showing. What is the expected value of the random variable X ?

- a. 3.5 b. 3 c. 2.5 d. 21 e. 6

7. Suppose a random variable X has expected value $\mu = 0.5$ and standard deviation $\sigma = 1.2$. What is $E(X^2)$?
- a. 1.70 b. 1.19 c. 1.69 d. 0.70 e. 2.89
8. A random variable X has expected value $\mu = 370$ and standard deviation $\sigma = 30$. Using the Chebychev Inequality, $\Pr(320 \leq X \leq 420)$ is greater than or equal to:
- a. $\frac{3}{37}$ b. $\frac{9}{25}$ c. $\frac{3}{5}$ d. $\frac{2}{5}$ e. $\frac{16}{25}$
9. A random variable X has expected value $\mu = 65$ and standard deviation $\sigma = 5$. Using the Chebychev Inequality, on what least interval is $\Pr(\mu - c \leq X \leq \mu + c)$ greater than or equal to $\frac{8}{9}$?
- a. $50 \leq X \leq 80$ b. $55 \leq X \leq 75$ c. $60 \leq X \leq 70$
- d. $62 \leq X \leq 68$ e. $45 \leq X \leq 85$

10. An experiment consists of flipping a coin 2 times and counting the number of tails. Compute the variance of the probability distribution of the experiment.

- a. 1 b. $\frac{1}{16}$ c. $\frac{1}{4}$ d. $\frac{1}{2}$ e. $\frac{3}{4}$

11. A temporary agency has 32 employees, 8 of whom are men. Each week a person is randomly selected to water the plants in the employee lounge. What is the expected number of weeks that women are chosen to water the plants during the course of a year? (Note - There are 52 weeks in a year).

- a. 24 b. 13 c. 52 d. 26 e. 39

12. During the last year, $\frac{2}{3}$ of all U-haul truck rentals were one-way rentals and $\frac{1}{3}$ were local rentals. What is the probability that 3 of the next 5 U-haul truck rentals will be local rentals?

- a. $\frac{40}{243}$ b. $\frac{4}{81}$ c. $\frac{5}{81}$ d. $\frac{240}{243}$ e. $\frac{80}{243}$

13. A recent traffic study found that only 30 percent of drivers come to a complete stop at a particular stop sign. Find the probability that out of the next 20 people driving up to the stop sign, at least one will come to a complete stop.

a. $1 - \binom{20}{1} (0.3)^1 (0.7)^{19}$ b. $\binom{20}{1} (0.3)^1 (0.7)^{19}$ c. $\binom{20}{1} (0.7)^1 (0.3)^{19}$

d. $\binom{20}{0} (0.3)^0 (0.7)^{20}$ e. $1 - \left[\binom{20}{0} (0.3)^0 (0.7)^{20} \right]$

14. B. J. and Jenny are playing a dice game. If a 6 is rolled, B. J. pays Jenny \$6, otherwise Jenny pays B. J. \$1. If they roll the dice 21 times, how much should B. J. expect to win?

a. \$ 21.00 b. \$ 3.50 c. \$17.50 d. - \$3.50 e. - \$6

15. If Z is the random variable for the standard normal distribution, what is $\Pr(-2 \leq Z \leq 1.5)$?

- a. 0.0228 b. 0.9104 c. 0.9772 d. 0.9332 e. 0.9228

16. Suppose the "writing life" of a ball point pen is a random variable having a normal distribution with $\mu = 100$ hours and $\sigma = 3$ hours. What is the probability that this type of ball point pen will have a writing life of less than 95 hours?

- a. 0.0446 b. 0.9505 c. 0.0495 d. 0.0885 e. 0.0668

17. The number of potato chips in a bag of chips is normally distributed with $\mu = 150$ and $\sigma = 4$. What is the probability that a bag contains more than 157 chips?

- a. $1 - A\left(\frac{7}{4}\right)$ b. $A\left(\frac{7}{4}\right)$ c. $1 - A\left(-\frac{7}{4}\right)$ d. $A\left(\frac{7}{4}\right) - 1$ e. $1 + A\left(\frac{7}{4}\right)$

18. Find the 84th percentile of the normal distribution with $\mu = 104.4$ and $\sigma = 18.6$.

- a. 114.4 b. 123.0 c. 118.0 d. 122.6 e. 120.4

19. Suppose a normal distribution has $\mu = 100$ and 95th percentile equal to 116.5. What is σ for this distribution?

- a. 1.65 b. 16.5 c. 9.5 d. 10 e. 8.25

20. Suppose we roll a dice 180 times. Use the normal distribution to approximate the probability of rolling exactly 37 sixes.

- a. 0.041 b. 0.030 c. 0.027 d. 0.033 e. 0.037