Chapter 15
Extra Practice Questions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the expected value of the random variable. Round to three decimal places.

1. The accompanying table describes the probability distribution for the number of adults in a certain town (among 4 randomly selected adults) who have a college degree.

x	P(x)
0	0.4096
1	0.4096
2	0.1536
3	0.0256
4	0.0016

   A. 1.21   B. 0.95   C. 0.70   D. 0.80   E. 2.00

1. _____

Create a probability model for the random variable.

2. You pick a card from a deck. If you get a face card, you win $15. If you get an ace, you win $25 plus an extra $40 for the ace of hearts. For any other card you win nothing.
   Create a probability model for the amount you win at this game.

2. _____

A.
Amount won	$0	$15	$25	$65
P(Amount won)	$\frac{32}{52}$	$\frac{16}{52}$	$\frac{3}{52}$	$\frac{1}{52}$

B.
Amount won	$0	$15	$25	$40
P(Amount won)	$\frac{36}{52}$	$\frac{12}{52}$	$\frac{3}{52}$	$\frac{1}{52}$

C.
Amount won	$0	$15	$25	$65
P(Amount won)	$\frac{36}{52}$	$\frac{12}{52}$	$\frac{4}{52}$	$\frac{1}{52}$

D.
Amount won	$0	$15	$25	$65
P(Amount won)	$\frac{36}{52}$	$\frac{12}{52}$	$\frac{3}{52}$	$\frac{1}{52}$

E.
Amount won	$0	$15	$25	$40
P(Amount won)	$\frac{39}{52}$	$\frac{4}{52}$	$\frac{4}{52}$	$\frac{1}{52}$

Find the expected value of the random variable. Round to three decimal places.

3. The probabilities that a batch of 4 computers will contain 0, 1, 2, 3, and 4 defective computers are 0.6274, 0.3102, 0.0575, 0.0047, and 0.0001, respectively. Find the expected number of defective computers in a batch of 4.

   A. 0.53   B. 1.07   C. 0.44   D. 0.34   E. 2.00

3. _____

Find the standard deviation of the random variable. Round to two decimal places if necessary.

4. The random variable x is the number of houses sold by a realtor in a single month at the Sendsom's Real Estate Office. Its probability distribution is as follows. Find the standard deviation of the number of houses sold.

Houses Sold (x)	Probability P(x)
0	0.24
1	0.01
2	0.12
3	0.16
4	0.01
5	0.14
6	0.11
7	0.21

4. _____

    A. 2.25   B. 1.62   C. 4.45   D. 6.86   E. 2.62

Find the standard deviation of the random variable.

5. A couple plans to have children until they get a boy, but they agree that they will not have more than four children even if all are girls.
Find the standard deviation of the number of children the couple have. Assume that boys and girls are equally likely. Round your answer to three decimal places.

5. _____

    A. 0.992   B. 0.984   C. 1.109   D. 1.053   E. 1.173

Create a probability model for the random variable.

6. You have arranged to go camping for two days in March. You believe that the probability that it will rain on the first day is 0.4. If it rains on the first day, the probability that it also rains on the second day is 0.6. If it doesn't rain on the first day, the probability that it rains on the second day is 0.4.
Let the random variable X be the number of rainy days during your camping trip. Find the probability model for X.

6. _____

A.
Rainy days	0	1	2
P(Rainy days)	0.36	0.4	0.24

B.
Rainy days	0	1	2
P(Rainy days)	0.36	0.48	0.16

C.
Rainy days	0	1	2
P(Rainy days)	0.24	0.52	0.24

D.
Rainy days	0	1	2
P(Rainy days)	0.36	0.16	0.24

E.
Rainy days	0	1	2
P(Rainy days)	0.36	0.24	0.24

Find the expected value of the random variable. Round to three decimal places.

7. In a box of 8 batteries, 6 are dead. You choose two batteries at random from the box.
Let the random variable X be the number of good batteries you get. Find the expected value of X.

7. _____

    A. $\mu = 0.29$ B. $\mu = 1.50$ C. $\mu = 0.50$ D. $\mu = 0.63$ E. $\mu = 0.86$

Solve.

8. Given independent random variables with means and standard deviations as shown, find the mean   8. _____
and standard deviation of the variable X + 17. Round to two decimal places if necessary.

	Mean	SD
X	60	8
Y	30	9

A. $\mu = 60, \sigma = 25$

B. $\mu = 77, \sigma = 8$

C. $\mu = 60, \sigma = 8$

D. $\mu = 77, \sigma = 18.79$

E. $\mu = 77, \sigma = 25$

9. Given independent random variables with means and standard deviations as shown, find the mean   9. _____
and standard deviation of the variable X + 4Y . Round to two decimal places if necessary.

	Mean	SD
X	70	12
Y	80	7

A. $\mu = 390, \sigma = 40$

B. $\mu = 320, \sigma = 30.46$

C. $\mu = 390, \sigma = 30.46$

D. $\mu = 150, \sigma = 30.46$

E. $\mu = 150, \sigma = 40$

10. An insurance company estimates that it should make an annual profit of $160 on each   10. _____
homeowner's policy written, with a standard deviation of $5000. If it writes 9000 of these policies,
what are the mean and standard deviation of the annual profit? Assume that policies are
independent of each other.

A. $\mu = \$15,178.93, \sigma = \$45,000,000$

B. $\mu = \$1,440,000, \sigma = \$474,341.65$

C. $\mu = \$1,440,000, \sigma = \$405,000,000,000$

D. $\mu = \$1,440,000, \sigma = \$45,000,000$

E. $\mu = \$15,178.93, \sigma = \$474,341.65$

11. Suppose that in one town, 50 year old men have a mean weight of 177 lb. with a standard deviation of 17 lb. 30 year old men have a mean weight of 158 lb. with a standard deviation of 12 lb. How much heavier do you expect a 50 year old man to be than a 30 year old man and what is the standard deviation of this difference?

11. _____

    A. 19 lb, 20.81 lb

    B. 335 lb, 12.04 lb

    C. 335 lb, 29 lb

    D. 19 lb, 12.04 lb

    E. 19 lb, 5 lb

Find the indicated probability.

12. The amount of money that Maria earns in a week is a random variable with a mean of $960 and a standard deviation of $35. The amount of money that Elena earns in a week is a random variable with a mean of $830 and a standard deviation of $15.
If the difference between Maria's weekly income and Elena's weekly income can be described be a Normal model, what is the probability that Maria's weekly income is at least $149.04 more than Elena's weekly income? (In other words, what is the probability that the difference M – E is at least $149.04?)
Assume that Maria's earnings are independent of Elena's earnings.

12. _____

    A. 0.345   B. 0.691   C. 0.309   D. 0.274   E. 0.655

1. D
2. D
3. C
4. E
5. D
6. A
7. C
8. B
9. C
10. B
11. A
12. C