

Lesson #28 · Topic 2E · Practice

Name _____

1. The means and standard deviations of independent random variables, S and T , are shown in the table.

Random variable	Mean	Standard deviation
S	34.8	7.9
T	53	6.5

- a. Let random variable V be defined as $V = S + T$. Find the mean and standard deviation of V .
- b. Let random variable W be defined as $W = T - S$. Find the mean and standard deviation of W .

2. Cece and Owen are visiting the library with their mother. Based on their previous visits, the distributions of the number of books they will want to check out are given in the following tables.

Cece

Number of books	0	1	2	3
Probability	0.05	0.20	0.45	0.30

Owen

Number of books	0	1	2
Probability	0.10	0.35	0.55

- a. Assuming they make their decisions independently, what is the probability that Cece wants to check out 1 book and Owen wants to check out 1 book? What other ways would lead them to want to check out 2 books total?
- b. What is the probability that the total number of books Cece and Owen want to check out is 2? Show your work.
- c. Let T = the total number of books that Cece and Owen want to check out. Complete the probability distribution table for T .

T	0	1	2	3	4	5
Probability				0.2975	0.3525	0.165

- d. Find the mean of the distribution T .

3. A maintenance company offers annual lawn mowing packages and snow plowing packages. The cost of the packages vary depending on the size of the yard and the area that will be plowed. The distribution of costs for lawn mowing packages is approximately normal with a mean of \$410 and a standard deviation of \$60. The distribution of costs for snow plowing packages is approximately normal with a mean of \$190 and a standard deviation of \$25. Let M = the cost of a randomly selected lawn mowing package and P = the cost of a randomly selected snow plowing package. Assume M and P are independent.
- Many customers purchase both a lawn mowing package and a snow plowing package. Let C = the total cost for a randomly selected customer who purchased both a lawn mowing package and a snow plowing package. Describe the shape of the distribution of C .
 - Find the mean and standard deviation of C .
 - Find and interpret $P(C > \$700)$.
4. A shoe company ships pairs of sandals and pairs of sneakers in shipping boxes. The distributions of weight for the pairs of sandals, the pairs of sneakers, and the shipping boxes are each approximately normal. The mean and standard deviation for each distribution is shown in the table.

Item	Mean	Standard deviation
Pairs of sandals	443 grams	68 grams
Pairs of sneakers	907 grams	155 grams
Shipping box	250 grams	100 grams

Assume the weights of the items are mutually independent. Let the random variable W represent the total weight of 1 pairs of sandals, 1 pair of sneakers, and 1 shipping box. What are the mean and standard deviation of W ?

5. In a long-term study conducted in Poland, it was found that the distribution of birth weights for full-term male babies was approximately normal with a mean of 3,622 grams and a standard deviation of 432 grams. The distribution of birth weights for full-term female babies was also approximately normal with a mean of 3,465 grams and a standard deviation of 414 grams. Assuming the birth weights are independent, what is the probability that a randomly selected female baby weighs more than a randomly selected male baby at the time of birth?
6. In a high school math class, students took a pre-test and a post-test at the beginning and end of a semester, respectively. The mean pre-test score was 37 points with a standard deviation of 12 points. The mean post-test score was 76 points with a standard deviation of 7 points. Let Y be the pre-test score of a randomly selected student in this class and let Z be the post-test score of the same student. Which of the following statements best describes the distribution of $Z - Y$?
- A) Since Y and Z are not independent variables, the mean is 39 points but the standard deviation cannot be determined.
 - B) Since Y and Z are not independent variables, the standard deviation is 19 points but the mean cannot be determined.
 - C) Since Y and Z are not independent variables, neither the mean nor the standard deviation can be determined.
 - D) Since Y and Z are independent variables, the mean is 39 points and the standard deviation is 13.9 points.

7. At a certain department store, the mean price of a women's sweater varies with a mean of \$33 and a standard deviation of \$9. Assume that the prices of different sweaters at this store are independent.

Let X = the total price of 1 randomly selected women's sweaters and a pair of jeans that always costs exactly \$20 from this department store. What is the standard deviation of the total price, ignoring sales tax?

- A) \$29
- B) \$53
- C) $\$ \sqrt{20 + 9^2}$
- D) \$9