

1. The probabilities that a randomly selected customer purchases 1, 2, 3, 4, or 5 items at a convenience store are 0.32, 0.12, 0.23, 0.18, and 0.15, respectively.

(a) Identify the random variable of interest. $X = \underline{\hspace{2cm}}$. Then construct a probability distribution (table), and draw a probability distribution histogram.

(b) Find $P(X > 3.5)$.

(c) Find $P(1.0 < X < 3.0)$.

(d) Find $P(X < 5)$.

e) Find the expected value and define it in context

2. A certain probability density function is made up of two straight-line segments. The first segment begins at the origin and goes to the point (1, 1). The second segment goes from (1, 1) to the point (x, 1).

(a) Sketch the distribution function, and determine what x has to be in order to be a legitimate density curve.

(b) Find $P(0 < X \leq 0.5)$.

(c) Find $P(X = 1)$.

(d) Find $P(0 < X < 1.25)$.

(e) Circle the correct option: X is an example of a
(discrete) (continuous) random variable. Explain:

3. The probabilities that a randomly selected customer purchases 1, 2, 3, 4, or 5 items at a convenience store are 0.32, 0.12, 0.23, 0.18, and 0.15, respectively.
- (a) Construct a probability distribution (table) for the data, and verify that this is a legitimate probability distribution.
 - (b) Calculate μ_x . Interpret this value in the context of this problem.
 - (c) Find the standard deviation of X.
 - (d) Suppose two customers, A and B, are selected at random. Find the mean and standard deviation of the difference in the number of items purchased by A and by B. Show your work.
4. Suppose that the mean height of policemen is 70 inches with a standard deviation of 3 inches. And suppose that the mean height for policewomen is 65 inches with a standard deviation of 2.5 inches. If heights of policemen and policewomen are Normally distributed:
- a) What is the mean difference in height of a policeman and policewoman selected randomly?
 - b) What is the standard deviation of the difference in the two heights?
 - c) Find the probability that a randomly selected policewoman is taller than a randomly selected policeman

5. A recent study showed that iphones need to be repaired up to 3 times during its ownership. Let “X” be the number of repairs necessary over the lifetime of a randomly selected iphone. The probability distribution are displayed below:

" X "	0	1	2	3
<i>P</i>	0.5	0.35	0.1	0.05

a) Find the mean and standard deviation of “X”

b) Suppose a MacBook Pro has a mean of 4 repairs in it’s lifetime with a standard deviation of 1.5. Assuming that the iphone and MacBook Pro break down independently of each other, compute and interpret the mean and standard deviation of the total number of repairs necessary for the two devices

c) Each iphone repair cost \$100 and each MacBook Pro repair cost \$250. Compute the mean and standard deviation of the total amount you can expect to pay in repairs over the life of the devices: