**#1**.

Suppose that $x$ represents the number of cars sold at a dealership in a randomly selected single day. The probability distribution of $x$ is given in the table below.

| $x$ | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|
| $p(x)$ | 0.04 | 0.09 | 0.17 | 0.29 | 0.20 | 0.14 | 0.07 |

What is the mean number of cars, $\mu$, sold per day at the dealership? Give your answer in decimal form precise to two decimal places.

$\mu =$ [ ] cars

# Scenario - 1:

Rhett owns a cupcake bakery and is analyzing his sales of cupcake delivery orders. Based on his daily sales of delivery orders for the past month, he has already calculated the probabilities ($P(x_i)$) for the number of boxes of cupcakes ($x_i$) purchased by a single customer in a single day, as shown in the table.

| $x_i$ | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| $P(x_i)$ | 0.45 | 0.25 | 0.18 | 0.07 | 0.05 |

Calculate the mean number of boxes of cupcakes ($\mu_X$) sold and delivered per person in a single day. Express your answer to two decimal places.

## #2 (use Scenario -1)

$\mu_X =$ [ ]

## #3 (use Scenario -1)

If a box of cupcakes costs \$30.00 and the flat-rate delivery fee is \$6.00, calculate the mean sales per person ($\mu_Y$) that the cupcake shop makes in a single day for delivery orders. Express your answer to the nearest cent.

$\mu_Y =$ \$ [ ]

# Scenario - 2:

Suppose Martin is a very talented used-car salesman. Whenever Martin talks to a new customer, there is a 50% chance that he convinces the customer to purchase one of his used cars. Brian, Martin's boss, is envious that Martin sells many more cars than he does. Because of his jealousy, Brian institutes a new rule that Martin is only allowed to talk to 55 customers per day. Thus, Martin continues to work each day until he speaks to 55 customers, at which point Brian sends him home. Let $X$ represent the number of used cars that Martin sells on a given day.

What are the mean, $\mu$, and variance, $\sigma^2$, of $X$? Please round your answers to the nearest two decimal places.

### #4 (use Scenario -2):

$\mu =$ [ ]

# Scenario – 3:

Suppose Kristen is researching failures in the restaurant business. In the city where she lives, the probability that an independent restaurant will fail in the first year is 49%. She obtains a random sample of 62 independent restaurants that opened in her city more than one year ago and determines if each one had closed within a year.

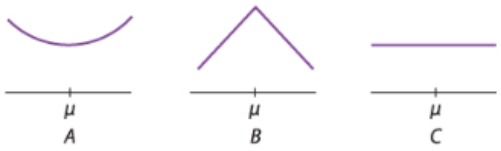
What are the mean and standard deviation of the number of restaurants that failed within a year? Please give your answers precise to two decimal places.

### #5 (use Scenario – 3):

$\mu =$ [ ]

### #6.

Continuous random variables A, B, and C all take values between 0 and 10. Their density curves, drawn on the same horizontal scales, are shown here.




Rank the standard deviations of the three random variables from smallest to largest.

- ◯ A, C, B
- ◯ B, C, A
- ◯ B, A, C
- ◯ C, B, A
- ◯ A, B, C

## #7.

A certain vending machine offers 20-ounce bottles of soda for $1.50. The number of bottles $X$ bought from the machine on any day is a random variable with mean 50 and standard deviation 15. Let the random variable $Y$ equal the total revenue from this machine on a randomly selected day. Assume that the machine works properly and that no sodas are stolen from the machine.

What are the mean and standard deviation of $Y$?

- ○ $\mu_Y = \$1.50\ \sigma_Y = \$22.50$
- ○ $\mu_Y = \$75\ \sigma_Y = \$33.75$
- ○ $\mu_Y = \$1.50\ \sigma_Y = \$33.75$
- ○ $\mu_Y = \$75\ \sigma_Y = \$18.37$
- ○ $\mu_Y = \$75\ \sigma_Y = \$22.50$

## #8.

Professional tennis player Novak Djokovic hits the ball extremely hard. His first-serve speeds follow an approximately Normal distribution with mean 115 miles per hour (mph) and standard deviation 6 mph. Choose one of Djokovic's first serves at random. Let $Y$ = its speed, measured in miles per hour.

Write the event "speed is between 100 and 120 miles per hour" in terms of $Y$. What is this probability?

- ○ $P(-2.5 < Y < 0.83) = 0.7270$
- ○ $P(100 < Y < 120) = 0.7915$
- ○ $P(100 < Y < 120) = 0.2185$
- ○ $P(100 < Y < 120) = 0.3145$
- ○ $P(-2.5 < Y < 0.83) = 0.0602$

## #9.

How does your web browser get a file from the Internet? Your computer sends a request for the file to a web server, and the web server sends back a response. Let $Y$ = the amount of time (in seconds) after the start of an hour at which a randomly selected request is received by a particular web server. The probability distribution of $Y$ can be modeled by a uniform density curve on the interval from 0 to 3600 seconds.

What is the probability that the request is received by this server within the first 5 minutes (300 seconds) after the hour?

- ○ 0.11
- ○ 0.083
- ○ 0.0014
- ○ 0.33
- ○ 0.25