

Valencia College
 Division of Architecture, Engineering, and Technology
 EGN 2440 Probability and Statistics for Engineers
 Summer 2015
 Instructor: Kwabena Oforu, Ph.D., P.E.

Quiz 2B

You will receive credit for showing your steps even if your final answers are incorrect.

An automobile design engineer has to select a new design based on the following factors

Gas mileage: high, medium, low

Cost categories: economy, mid-level, luxury

Mileage per year: less than 12,000, 12,000 to 50,000, 50,000 to 100,000, more than 100,000

Chassis: generic, specialty, performance

1. How many possible design scenarios are there? (2 points)

$$3 \cdot 3 \cdot 4 \cdot 3 = 108$$

2. What is the probability of a high or medium gas mileage design?

(2 points) # high or medium = $2 \cdot 3 \cdot 4 \cdot 3 = 72$

$$P(\text{high or medium}) = \frac{72}{108} = \frac{6}{9} = \frac{2}{3}$$

3. What is the probability of a design for low gas mileage and mileage of greater than 50,000 miles per year? (1 point)

> 50K = $3 \cdot 2 \cdot 2 \cdot 3 = 36$, low gas = $1 \cdot 3 \cdot 4 \cdot 3 = 36$

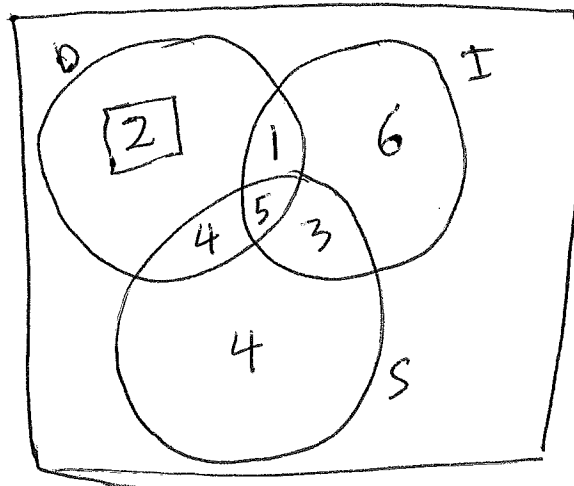
$$\text{Prob} = \frac{36}{108} \cdot \frac{36}{108} = 0.11$$

4. What are the odds that a low gas mileage design will not be selected? (2 points)

$$1 - \frac{36}{108} = \frac{72}{108} = \frac{2}{3}$$

5. A factory produces 25 styles of an electrical part that can be used in 3 operating environments, namely domestic, industrial, and specialty. 5 of them can be used in all 3 environments, whereas 3 can be used in industrial and specialty only, 1 in industrial and domestic only, 4 in domestic and specialty only, 4 in specialty only, and 6 in industrial only. Draw and complete the Venn diagram for this data.

(3 points)



Name: _____

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Quiz 2A

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An automobile design engineer has to select a new design based on the following factors

Gas mileage category: high, medium, low

Cost categories: economy, mid-level, luxury

Mileage per year: less than 12,000, 12,000 to 50,000, 50,000 to 100,000, more than 100,000

Chassis: generic, specialty, performance

1. How many possible design scenarios are there? (2 points)

$$3 \cdot 3 \cdot 4 \cdot 3 = 108$$

A website requires a password consisting of 8 characters. The eligible characters are lower case letters, upper case letters, the numbers 0–9, and special characters +, *, /, &, ^. A character can be used only once in the password.

2. What is the total number of possible passwords? (2 points)

$$\text{Characters} = 26 + 26 + 10 + 5 = 67$$

$$67P_8 \text{ or } 67 \cdot 66 \cdot 65 \cdot 64 \cdot 63 \cdot 62 \cdot 61 \cdot 60 = 262,981,618,099,200$$

3. For any given set of 8 characters, how many passwords can be formed? (1 point)

$$8P_8 = 40320$$

4. What are the odds of a cyber-criminal correctly guessing the password? (2 points)

$$\frac{1}{262,981,618,099,200}$$

5. A factory produces 25 styles of an electrical part that can be used in 3 operating environments, namely domestic, industrial, and specialty. 5 of them can be used in all 3 environments, whereas 3 can be used in industrial and specialty only, 1 in industrial and domestic only, 4 in domestic and specialty only, 4 in specialty only, and 6 in industrial only. Draw and complete the Venn diagram for this data. (3 points)

