

Student: _____
Date: _____

Instructor: Andreas Lazari
Course: Math2620 F - Fall 2018

Assignment: Chapter 5.1-Homework

1. Is the following a probability model? What do we call the outcome "red"?

Color	Probability
red	0
green	0.35
blue	0.1
brown	0.1
yellow	0.2
orange	0.25

Is the table above an example of a probability model?

1

- A. No, because the probabilities do not sum to 1.
- B. Yes, because the probabilities sum to 1.
- C. No, because not all the probabilities are greater than 0.
- D. Yes, because the probabilities sum to 1 and they are all greater than or equal to 0 and less than or equal to 1.

What do we call the outcome "red"?

- A. Certain event
- B. Not so unusual event
- C. Impossible event
- D. Unusual event

2. Why is the following not a probability model?
1 Click the icon to view the data table.

Determine why it is not a probability model. Choose the correct answer below.

- A. This is not a probability model because at least one probability is greater than 0.
- B. This is not a probability model because at least one probability is less than 0.
- C. This is not a probability model because at least one probability is greater than 1.
- D. This is not a probability model because the sum of the probabilities is not 1.

1: More Info

Color	Probability
Red	0.2
Green	-0.3
Blue	0.1
Brown	0.4
Yellow	0.3
Orange	0.3

3. Which of the following numbers could be the probability of an event?

1, -0.55, 0, 1.3, 0.06, 0.33

The numbers that could be a probability of an event are 0, 0.06, 0.33, 1
(Use a comma to separate answers as needed.)

4. If a person flips a coin and then spins a six-space spinner, describe the sample space of possible outcomes using H, T for the coin outcomes and 1, 2, 3, 4, 5, 6 for the spinner outcomes.

The sample space is $S = \{H_1, H_2, H_3, H_4, H_5, H_6, T_1, T_2, T_3, T_4, T_5, T_6\}$.
(Use a comma to separate answers as needed.)

5. According to a certain country's department of education, 40.3% of 3-year-olds are enrolled in day care. What is the probability that a randomly selected 3-year-old is enrolled in day care?

The probability that a randomly selected 3-year-old is enrolled in day care is 0.403.
(Type an integer or a decimal.)

6. Let the sample space be $S = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$. Suppose the outcomes are equally likely. Compute the probability of the event $E = \{2, 6, 10\}$.

$n=10 \Rightarrow P(A) = \frac{1}{n} = \frac{1}{10}$
 $P(E) = \frac{3}{10} = 0.3$
 $P(E) =$ 0.3 (Type an integer or a decimal. Do not round.)

7. Let the sample space be $S = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$. Suppose the outcomes are equally likely. Compute the probability of the event $E =$ "an odd number less than 9."

$E = \{1, 3, 5, 7\} \Rightarrow P(E) = \frac{4}{10} = 0.4$
 $P(E) =$ 0.4 (Type an integer or a decimal. Do not round.)

8. Let the sample space be $S = \{1, 2, 3, 4\}$. Suppose the outcomes are equally likely. Compute the probability of the event $E =$ "an even number."

$n=4 \Rightarrow P(A) = \frac{1}{n} = \frac{1}{4}$
 $E = \{2, 4\} \Rightarrow P(E) = \frac{2}{4} = 0.5$
 $P(E) =$ 0.5 (Type an integer or a decimal. Do not round.)

9. A bag of 100 tulip bulbs purchased from a nursery contains 40 red tulip bulbs, 20 yellow tulip bulbs, and 40 purple tulip bulbs.

(a) What is the probability that a randomly selected tulip bulb is red?

$$P(\text{Red}) = \frac{40}{100} = 0.4$$

(b) What is the probability that a randomly selected tulip bulb is purple?

(c) Interpret these two probabilities.

(a) The probability that a randomly selected tulip is red is 0.4.
(Type an integer or a decimal. Do not round.)

(b) The probability that a randomly selected tulip bulb is purple is 0.4. $P(\text{Purple}) = \frac{40}{100} = 0.4$
(Type an integer or a decimal. Do not round.)

(c) Select the correct choice below and fill in the answer boxes within your choice.
(Type whole numbers.)

A. If 100 tulip bulbs were sampled with replacement, one would expect exactly _____ of the bulbs to be red and exactly _____ of the bulbs to be purple.

B. If 100 tulip bulbs were sampled with replacement, one would expect about 40 of the bulbs to be red and about 40 of the bulbs to be purple.

10. In a national survey college students were asked, "How often do you wear a seat belt when riding in a car driven by someone else?" The response frequencies appear in the table to the right. (a) Construct a probability model for seat-belt use by a passenger. (b) Would you consider it unusual to find a college student who never wears a seat belt when riding in a car driven by someone else?

Response	Frequency
Never	121
Rarely	325
Sometimes	555
Most of the time	1062
Always	2530

$\frac{121}{4593} = 0.026$
4593

(a) Complete the table below.

Response	Probability
Never	<u>0.026</u> (Round to the nearest thousandth as needed.) $\frac{121}{4593} = 0.026344 \approx 0.026$
Rarely	<u>0.071</u> (Round to the nearest thousandth as needed.) $\frac{325}{4593} = 0.070759 \approx 0.071$
Sometimes	<u>0.121</u> (Round to the nearest thousandth as needed.) $\frac{555}{4593} = 0.120836 \approx 0.121$
Most of the time	<u>0.231</u> (Round to the nearest thousandth as needed.) $\frac{1062}{4593} = 0.2312214 \approx 0.231$
Always	<u>0.551</u> (Round to the nearest thousandth as needed.) $\frac{2530}{4593} = 0.5508382 \approx 0.551$

(b) Would you consider it unusual to find a college student who never wears a seat belt when riding in a car driven by someone else?

- A. No, because the probability of an unusual event is 0.
- B. Yes, because $P(\text{never}) < 0.05$.
- C. No, because there were 121 people in the survey who said they never wear their seat belt.
- D. Yes, because $0.01 < P(\text{never}) < 0.10$.

11. Determine whether the probabilities below are computed using the classical method, empirical method, or subjective method. Complete parts (a) through (d) below.

(a) The probability of having seven girls in a seven-child family is 0.0078125.

- A. Subjective method
- B. Empirical method
- C. Classical method
- D. It is impossible to determine which method is used.

(b) On the basis of a survey of 1000 families with seven children, the probability of a family having seven girls is 0.0066.

- A. Subjective method
- B. Empirical method
- C. Classical method
- D. It is impossible to determine which method is used.

(c) According to a sports analyst, the probability that a football team will win the next game is 0.42.

- A. Classical method
- B. Empirical method
- C. Subjective method
- D. It is impossible to determine which method is used.

(d) On the basis of clinical trials, the probability of efficacy of a new drug is 0.82.

- A. Empirical method
- B. Classical method
- C. Subjective method
- D. It is impossible to determine which method is used.

1. D. Yes, because the probabilities sum to 1 and they are all greater than or equal to 0 and less than or equal to 1.

C. Impossible event

2. B. This is not a probability model because at least one probability is less than 0.

3. 0,0.06,0.33,1

4. H1,H2,H3,H4,H5,H6,T1,T2,T3,T4,T5,T6

5. 0.403

6. 0.3

7. 0.4

8. 0.5

9. 0.4

0.4

B.

If 100 tulip bulbs were sampled with replacement, one would expect about 40 of the bulbs to be red and about 40 of the bulbs to be purple.

10. 0.026

0.071

0.121

0.231

0.551

B. Yes, because $P(\text{never}) < 0.05$.

11. C. Classical method

B. Empirical method

C. Subjective method

A. Empirical method
