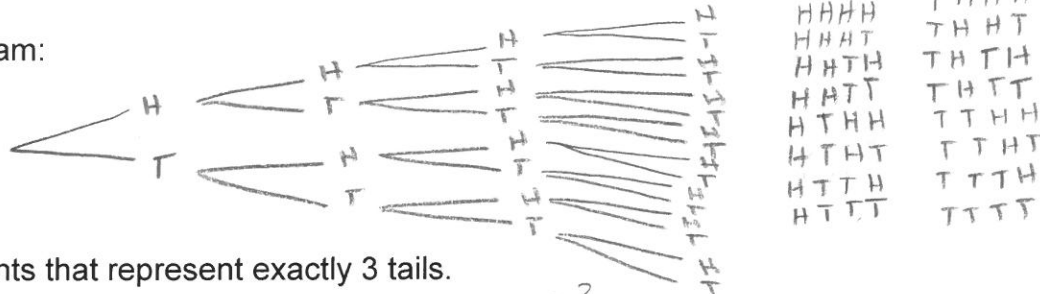


Unit 1 Quiz 2 Probability Review

Name Key

1. A coin is flipped 4 times. Create a tree diagram to represent the sample space.

a. Tree Diagram:



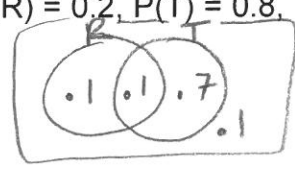
b. List the events that represent exactly 3 tails.

$$\{HTTT, THTT, TTHT, TTTT\}$$

c. List the events that you get a heads first and second.

$$\{HHHH, HHHT, HHTT, HHTH\}$$

2. Let R and T be events of an experiment with sample space S . Suppose $P(R) = 0.2$, $P(T) = 0.8$. And $P(R \cap T) = 0.1$, find:



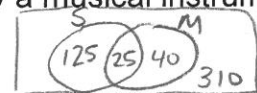
a. $P(R^c) = 0.8$

b. $P(R \cup T) = 0.9$

c. $P(R^c \cup T^c) = P(R \cap T)^c = 0.9$

d. $P(R^c \cap T) = 0.7$

3. There are 500 students at a school. 150 play a sport, 65 play a musical instrument, and 25 play both.



a. What is the probability that a student plays both or only a musical instrument?

$$\frac{25}{500} + \frac{40}{500} = \frac{65}{500} = \frac{13}{100}$$

b. What is the probability that a student selected at random from this group plays exactly one of these two types of activities?

$$\frac{125}{500} + \frac{40}{500} = \frac{165}{500} = \frac{33}{100}$$

4. Suppose you roll a pair of dice.

a. Draw a table to represent the sample space.

Product of 6: (2,3), (3,2), (1,6), (6,1)
 Sum of 5: (2,3), (3,2), (1,4), (4,1)

	1	2	3	4	5	6
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

b. Find the probability that the product of the two die is 6 or the sum is 5.

$$\frac{4}{36} + \frac{4}{36} - \frac{2}{36} = \frac{6}{36} = \frac{1}{6}$$

c. Find the probability that the first number is a multiple of 2 and the second is even.

multiple of 2 and even: (2,2), (2,4), (2,6), (4,2), (4,4), (4,6), (6,2), (6,4), (6,6)

$$\frac{9}{36} = \frac{1}{4}$$

Unit 1 Quiz 2 Probability Review

Name Key

5. An election ballot asks voters to select no more than three city commissioners but at least one from a group of six candidates. In how many ways can this be done?

$${}^6C_3 + {}^6C_2 + {}^6C_1 = 20 + 15 + 6 = \boxed{41}$$

- b. Suppose they chose exactly the 3 commissioners and designated them to specific jobs. How many ways can this be done?

$${}^6P_3 = \boxed{120}$$

6. There are 20 melted Mini Snickers bars in a bag of 65. If you choose 5, one at a time and without replace, what is the probability that the first one is not melted and the last 4 are melted?

$$\left(\frac{45}{65}\right)\left(\frac{20}{64}\right)\left(\frac{19}{63}\right)\left(\frac{18}{62}\right)\left(\frac{17}{61}\right) = \boxed{.0053}$$

7. What does it mean if two sets are mutually exclusive? Give an example.

Two sets are mutually exclusive if they have no intersection of common elements.

8. Martha has 4 pairs of sneakers and 7 pairs of sandals. Without looking, she pulls a sandal from the closet. What is the probability that the next shoe she pulls out will also be a sandal?

4 pair = 8 sneakers

1st draw: $\frac{14}{22}$

2nd draw: $\frac{13}{21}$

7 pair = 14 sandals

9. Consider a set of cards labeled 1-10. Let set A = even numbers and set B = # greater than 8. Find the probability of A or B.

$$A = \{2, 4, 6, 8, 10\}$$

$$B = \{9, 10\}$$

$$\frac{5}{10} + \frac{2}{10} - \frac{1}{10} = \frac{6}{10} = \frac{3}{5}$$

$$P(A) + P(B) - P(A \cap B)$$

10. A used car lot has 17 Toyota minivans, 19 Ford minivans, 12 Toyota trucks, and 11 Ford trucks. If a vehicle is selected at random from the used car lot, find the probability the vehicle is a Toyota or a truck.

$$\frac{29}{59} + \frac{23}{59} - \frac{12}{59} = \frac{40}{59}$$

Toyota Trucks Toyota and Truck

11. A bag of candy contains 6 Hershey Kisses, 7 Reese's Cups, 12 Starbursts, and 4 Jolly Ranchers. Suppose 4 pieces of candy are drawn for the bag, one at a time, and without replacement. What is the probability that you will choose a Jolly Rancher, a Reese's Cup, another Jolly Rancher and a Starburst, in that order?

$$\left(\frac{4}{29}\right)\left(\frac{7}{28}\right)\left(\frac{3}{27}\right)\left(\frac{12}{26}\right) = \frac{2}{1131}$$

12. What is the probability that the LEGO factory will produce at least one defective LEGO during the next 5 years if the probability of a defect is .007 per year?

$$P(\text{at least 1 defective lego}) = 1 - P(\text{no defect})^n$$

$$= 1 - (.993)^5$$

$$= .0345$$

$$\boxed{3.45\%}$$