Section 4.1 Worksheet - - - Intro to Probability

MDM4U

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1. What is the probability of choosing a King from a standard deck of 52 playing cards?

$$P(King) = \frac{n(Kings)}{n(cards)} = \frac{4}{52} = \frac{1}{13}$$

2. What is the probability of choosing a green marble from a jar containing 5 red, 6 green and 4 blue marbles?

$$P(green) = \frac{n(green)}{n(marbles)} = \frac{6}{15} = \frac{2}{5}$$

3. What is the probability of choosing a marble that is not blue in problem 2?

$$P(not\ blue) = 1 - P(blue) = 1 - \frac{4}{15} = \frac{11}{15}$$

4. What is the probability of getting an odd number when rolling a single 6-sided die?

$$P(odd) = \frac{n(odd)}{n(outcomes)} = \frac{3}{6} = \frac{1}{2}$$

5. What is the probability of choosing a jack or a queen from a standard deck of 52 cards?

$$P(jack\ or\ queen) = P(jack) + P(queen) = \frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \frac{2}{13}$$

6. What is the probability of landing on an odd number after spinning a spinner with 7 equal sectors numbered 1 through 7?

$$P(odd) = \frac{n(odd)}{n(oucomes)} = \frac{4}{7}$$

7. What is the probability of choosing a queen, a king or an ace from a standard deck of playing cards?

$$P(queen\ or\ king\ or\ ace) = P(queen) + P(king) + P(ace) = \frac{4}{52} + \frac{4}{52} + \frac{4}{52} = \frac{12}{52} = \frac{3}{13}$$

8. A national survey was taken measuring the highest level of educational achievement among adults age 30 and over. Express each probability to the nearest .001.

Highest level of education	Women	Men	Total
8th grade or less	35	46	81
High school graduate	232	305	537
Some college	419	374	793
Bachelor's degree	539	463	1002
Graduate or professional degree	377	382	759
Total	1602	1570	3172

a) What is the probability that a randomly chosen person from the survey group is a man?

$$P(man) = \frac{n(men)}{n(people)} = \frac{1570}{3172} = 0.495$$

b) What is the probability that the highest level of education completed by a randomly chosen person from the survey group is a bachelors degree?

$$P(bachelors\ degree) = \frac{n(bachelors\ degree)}{n(people)} = \frac{1002}{3172} = 0.316$$

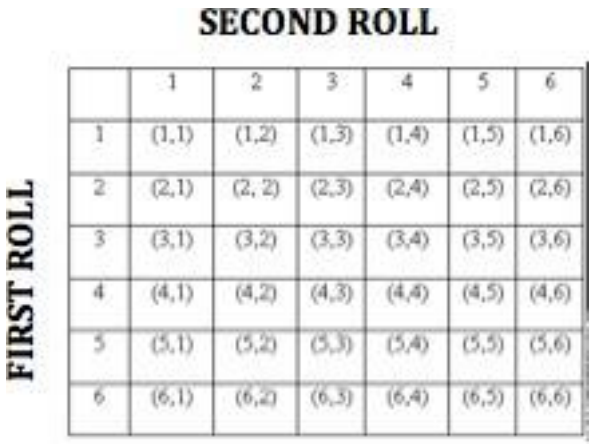
c) What is the probability that a randomly chosen woman has earned a bachelor's or graduate degree?

$$P(bachelors\ given\ woman) = \frac{n(women\ with\ bachelors\ or\ graduate)}{n(women)} = \frac{539 + 377}{1602} = \frac{916}{1602} = 0.572$$

d) What is the probability that a randomly chosen person whose highest level of education is high school is a man?

$$P(man\ given\ high\ school) = \frac{n(men\ with\ high\ school)}{n(high\ school)} = \frac{305}{537} = 0.568$$

9. Two fair dice are rolled.



FIRST ROLL \ SECOND ROLL	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)

a) What is the probability that the second die lands on a higher value than does the first?

$$P(\textit{second die is higher}) = \frac{n(\textit{second die is higher})}{n(\textit{outcomes})} = \frac{15}{36}$$

b) What is the probability that the sum of the values is a prime number?

$$P(\textit{prime}) = \frac{n(\textit{prime})}{n(\textit{outcomes})} = \frac{15}{36}$$

c) What is the probability the sum of the digits is a prime assuming the first dice rolled a value of either 3 or a 4.

$$P(\textit{prime given a 3 or 4 on first roll}) = \frac{n(\textit{prime sum with 3 or 4 on first roll})}{n(\textit{outcomes with 3 or 4 on first roll})} = \frac{4}{12} = \frac{1}{3}$$

d) What is the probability that the sum of the dice is 9?

$$P(\textit{sum is 9}) = \frac{n(\textit{sum of 9})}{n(\textit{outcomes})} = \frac{4}{36} = \frac{1}{9}$$