Probability Practice Name_____

1. Determine if the events are mutually exclusive.
   a. Drawing a card from a deck: Getting a 5 and a 7 Not
   b. Drawing a card from deck: Getting a hearts and getting a 6 Yes
   c. Rolling a die: Getting a prime number and getting a number less than 2 Yes
   d. Rolling a die: Getting a prime number and getting a number greater than 2. Not
   e. Picking out a pet at the store: Getting a dog and getting a cat. Yes
   f. Picking out a pet at the store: getting a reptile and getting a snake. Not

2. An automobile dealer decides to select a month for its annual sale. Find the probability that it will be September or October.

Mutually exclusive

$P(\text{September}) = \frac{1}{12}$ $P(\text{October}) = \frac{1}{12}$

$P(\text{September or October}) = \frac{1}{12} + \frac{1}{12} = \frac{2}{12} = \frac{1}{6}$

3. At a community swimming pool there are 2 managers, 8 lifeguards, 3 concession stand clerks and 2 maintenance people. If a person is selected at random, find the probability that the person is either a lifeguard or a manager.

Total = 15

mutually exclusive

$P(\text{lifeguard}) = \frac{8}{15}$ $P(\text{manager}) = \frac{2}{15}$

$P(\text{lifeguard or manager}) = \frac{8}{15} + \frac{2}{15} = \frac{10}{15} = \frac{2}{3}$

4. At a convention there are 7 math instructors, 5 computer science instructors, 3 statistics instructors and 4 science instructors. If an instructor is selected at random, find the probability of selecting a math or science instructor.

Total = 19

mutually exclusive

$P(\text{Math}) = \frac{7}{19}$ $P(\text{Science}) = \frac{4}{19}$

$P(\text{Math or Science}) = \frac{7}{19} + \frac{4}{19} = \frac{11}{19}$

5. Blockbuster rented the following number of movie titles in each of these categories: 170 horror: 230 drama;120 mystery,310 romance, and 150 comedies. If a person who rented one of the movies is selected at random, find the probability that a romance or comedy was rented.

Total = 980

mutually exclusive

$P(\text{romance}) = \frac{310}{980}$ $P(\text{comedy}) = \frac{150}{980}$

$P(\text{romance or comedy}) = \frac{310}{980} + \frac{150}{980} = \frac{460}{980} = \frac{23}{49}$

6. The probability that s student owns a car is 0.65, and the probability that a student owns a computer is 0.82. If the probability that a student owns both is 0.55, what is the probability that a randomly selected student owns a car or computer? What is the probability that a randomly selected student does not own a car or computer?

Not mutually exclusive.

$P(\text{car}) = 0.65$ $P(\text{computer}) = 0.82$ $P(\text{car and computer}) = 0.55$

$P(\text{car or computer}) = 0.65 + 0.82 - 0.55 = 0.92$

7. In a statistics class there are 18 juniors and 10 seniors; 6 of the seniors are females and 12 of the juniors are males. If a student is selected at random, find the probability of selecting the following:

a) P(a junior or a female) $P(\text{junior}) = \frac{18}{28}$ $P(\text{female}) = \frac{12}{28}$ $P(\text{Junior and female}) = \frac{6}{28}$

$P(\text{junior or female}) = \frac{18}{28} + \frac{12}{28} - \frac{6}{28} = \frac{24}{28} = \frac{6}{7}$

b) P(a senior or a female)

$P(\text{Senior}) = \frac{10}{28}$ $P(\text{female}) = \frac{12}{28}$ $P(\text{senior and female}) = \frac{6}{28}$

$P(\text{Senior or female}) = \frac{10}{28} + \frac{12}{28} - \frac{6}{28} = \frac{16}{28}$

c) P(a junior or a senior)

$P(\text{Junior}) = \frac{18}{28}$ $P(\text{Senior}) = \frac{10}{28}$ $P(\text{Junior or Senior}) = \frac{18}{28} + \frac{10}{28} = \frac{28}{28}$

	male	female	
Junior	12	6	18
Senior	4	6	10
	16	12	28

8. In a bag of marbles there are 5 green, 6 red, and 4 yellow. Total = 15

a. What is the probability of pulling a red marble and then pulling a yellow marble with replacement? mutually exclusive

$P(\text{red}) = \frac{6}{15}$ $P(\text{yellow}) = \frac{4}{15}$ $P(\text{red and yellow}) = \frac{6}{15} \cdot \frac{4}{15} = \frac{24}{225}$

b. What is the probability of pulling a green marble and then a yellow with replacement? mutually exclusive

$P(\text{Green}) = \frac{5}{15}$ $P(\text{yellow}) = \frac{4}{15}$ $P(\text{Green and Yellow}) = \frac{5}{15} \cdot \frac{4}{15} = \frac{20}{225}$

c. What is the probability of pulling a red marble and then a green without replacement? not mutually exclusive

$P(\text{red}) = \frac{6}{15}$ $P(\text{green}|\text{red}) = \frac{5}{14}$ $P(\text{red and green}) = \frac{6}{15} \cdot \frac{5}{14} = \frac{30}{210}$

d. What is the probability of pulling a yellow and then a red without replacement not mutually exclusive

$P(\text{yellow}) = \frac{4}{15}$ $P(\text{red}|\text{yellow}) = \frac{6}{14}$ $P(\text{yellow and red}) = \frac{4}{15} \cdot \frac{6}{14} = \frac{24}{210}$

9. Given a deck of cards – 52 cards, 4 of each number, 13 each suit.

a. What is the probability of drawing a diamond and then a 4 with replacement? mutually exclusive

$P(\text{diamond}) = \frac{13}{52}$ $P(4) = \frac{4}{52}$ $P(\text{Diamond and } 4) = \frac{52}{2704} = \frac{1}{52}$

b. What is the probability of drawing a 5 and then drawing a 7 with replacement? mutually exclusive

$P(5) = \frac{4}{52}$ $P(7) = \frac{4}{52}$ $P(4 \text{ and } 7) = \frac{4}{52} \cdot \frac{4}{52} = \frac{16}{2704} = \frac{1}{169}$

c. What is the probability of drawing a king of hearts and then drawing a heart without replacement? not mutually exclusive

$P(\text{King of hearts}) = \frac{1}{52}$ $P(\text{hearts}|\text{King of hearts}) = \frac{12}{51}$ $P(\text{King of hearts and hearts}) = \frac{1}{52} \cdot \frac{12}{51} = \frac{12}{2652} = \frac{1}{221}$

d. What is the probability of drawing a jack and then a club without replacement? not mutually exclusive.

$P(\text{Jack}) = \frac{4}{52}$ $P(\text{Club}|\text{Jack}) = \frac{13}{51}$ $P(\text{Jack and club}) = \frac{4}{52} \cdot \frac{13}{51} = \frac{52}{2652} = \frac{1}{51}$

10. Andrea is a very good student. The probability that she studies and passes her mathematics test is $\frac{17}{20}$. If the probability that Andrea studies is $\frac{15}{16}$, find the probability that Andrea passes her mathematics test, given that she has studied.

$P(\text{studies and passes}) = \frac{17}{20}$ $P(\text{studies}) = \frac{15}{16}$ $P(\text{passes}|\text{studied}) = \frac{\frac{17}{20}}{\frac{15}{16}} = \frac{272}{300}$

11. The probability that Janice smokes is $\frac{3}{10}$. The probability that she Smokes and develops lung cancer is $\frac{4}{15}$. Find the probability that Janice develops lung cancer, given that she smokes.

$P(\text{Smokes}) = \frac{3}{10}$ $P(\text{Smokes and Lung Cancer}) = \frac{4}{15}$

$P(\text{lung cancer}|\text{smokes}) = \frac{\frac{4}{15}}{\frac{3}{10}} = \frac{4}{15} \cdot \frac{10}{3} = \frac{40}{45} = \frac{8}{9}$

12. The probability that Sue will go to Mexico in the winter and to France in the summer is 0.40. The probability that she will go to Mexico in the winter is 0.60. Find the probability that she will go to France this summer, given that she just returned from her winter vacation in Mexico.

$P(\text{Mexico and France}) = 0.40$ $P(\text{Mexico}) = 0.60$ $P(\text{France}|\text{Mexico}) = \frac{0.40}{0.60} = \frac{2}{3}$