Probability Mixed Practice 1 **Name:** Answers

1) For all problems: a bowl contains disks numbered from 1-15. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

Part A: One disk is drawn.

P(odd)= $\frac{8}{15}$ (1, 3, 5, 7, 9, 11, 13, 15)

P(multiple of 3)= $\frac{5}{15}$ (3, 6, 9, 12, 15)

P(not 7) = $\frac{14}{15}$

P(greater than 12)= $\frac{3}{15}$ (13, 14, 15)

P(even and more than 10)= $\frac{2}{15}$ (12, 14)

P(not even) = P(odd) = $\frac{8}{15}$

P(4)= $\frac{1}{15}$

P(even or more than 10)= $\frac{10}{15}$ (2, 4, 6, 8, 10, 11, 12, 13, 14, 15)

P(not 2,3 or 10) $\frac{12}{15}$

Part B: A disk is drawn, replaced and a second is drawn.

P(even, even)= $\frac{7}{15} \cdot \frac{7}{15} = \frac{49}{225}$

P(4, even)= $\frac{1}{15} \cdot \frac{7}{15} = \frac{7}{225}$

P(4, 4)= $\frac{1}{15} \cdot \frac{1}{15} = \frac{1}{225}$

P(less than 3, 8)= $\frac{2}{15} \cdot \frac{1}{15} = \frac{2}{225}$

} independent events

Part C: A disk is drawn, not replaced and a second is drawn.

P(both 5)= $\frac{1}{15} \cdot \frac{0}{15} = 0$

P(even, odd)= $\frac{7}{15} \cdot \frac{8}{14} = \frac{56}{210}$

P(7, odd)= $\frac{1}{15} \cdot \frac{7}{14} = \frac{7}{210}$

P(even, even)= $\frac{7}{15} \cdot \frac{6}{14} = \frac{42}{210}$

P(3, less than 5)= $\frac{1}{15} \cdot \frac{3}{14} = \frac{3}{210}$

P(prime, 8)= $\frac{6}{15} \cdot \frac{1}{14} = \frac{6}{210}$ (2, 3, 5, 7, 11, 13)

} dependent events

2) If I have 6 pairs of pants, 12 shirts, and 3 sweaters, how many outfits can I make (assuming an outfit consists of 1 pair of pants, 1 shirt, and 1 sweater)?

Use counting principle: $6 \cdot 12 \cdot 3 = 216$ outfits

3) How many different ways can you arrange the word GREYHOUND assuming you use each letter once?

Use counting principle: $9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 362{,}880$

4) Your math teacher keeps a bag that contains gumballs of three different colors: 4 blue, 2 green, and 5 orange. You select three pieces of candy at random, without replacement. 11 gumballs in all

Calculate the probability that the first piece selected will be a green gumball and the other two will be orange

$$P(g,o,o) = \frac{2}{11} \cdot \frac{5}{10} \cdot \frac{4}{9} = \boxed{\frac{40}{990}}$$

Calculate the probability that all three pieces selected will be the same flavor of candy.

$$P(b,b,b) \text{ or } P(o,o,o) \text{ or } P(g,g,g)$$

$$\frac{4}{11} \cdot \frac{3}{10} \cdot \frac{2}{9} + \frac{5}{11} \cdot \frac{4}{10} \cdot \frac{3}{9} + \frac{2}{11} \cdot \frac{1}{10} \cdot \frac{0}{9}$$

$$\frac{24}{990} + \frac{60}{990} = \boxed{\frac{84}{990}}$$

5) In a game, you choose a card from a box containing 4 red cards, 6 blue cards, and 5 yellow cards. You replace the first card in the box and then choose again. What is the probability of choosing a red card and then a blue card?

15 in all

$$P(r,b) = \frac{4}{15} \cdot \frac{6}{15} = \boxed{\frac{24}{225}}$$

6) A letter is picked at random from the word "BASEBALL." What is the probability that the letter L and then a vowel are selected without replacement? 8 letters

$$P(L, \text{vowel}) = \frac{2}{8} \cdot \frac{3}{7} = \boxed{\frac{6}{56}}$$

7) Which probability would you consider to be examples of empirical probability (i.e. you would need data to determine the probability of something happening) and which would you consider to be examples of theoretical probability (i.e. you can determine the probability of something happening by using math)? Circle the appropriate description and be prepared to explain your answers!

Basketball: If I shoot two baskets, what's the probability that I make both? **Empirical** ***or*** **Theoretical**

Dice: If I roll two fair dice, what's the probability that I get two 5's? **Empirical** ***or*** **Theoretical**

Cards: If I have a deck of cards, what's the probability that I select a king? **Empirical** ***or*** **Theoretical**

Weather: What's the probability that it will snow tomorrow? **Empirical** ***or*** **Theoretical**

Clothes: What's the probability that Ms. Stewart will wear black tomorrow? **Empirical** ***or*** **Theoretical**

What's another example of empirical probability?