Probability Quiz Review

<u>13.1 Introduction to Probability</u>

1. Each letter in PENNSYLVANIA is written on a separate piece of paper and put into a bag. You randomly choose a piece of paper from the bag.

a. What is the probability that you choose an N?

b. What is the probability that you choose an A?

c. What is the probability that you choose an E?

2. When rolling a number cube with numbers 1-6. What is the probability of rolling a prime number?

3. You have a bag containing different color markers. You have 6 red markers, 9 brown markers, 6 teal markers, and 4 yellow markers.

a. What is the theoretical probability of choosing a red or teal marker?

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<u>13.2 Counting Principle</u>

4. A restaurant offers choices of a chicken, beef, or pork entrée, soup or salad, and baked potato, mashed potatoes, or rice. Use the counting principle to determine the number of outcomes.

5. You want a new 2-door or 4-door car in blue, black, or red. You may or may not get a CD player. How many different cars are possible?

6. A pizza comes with a choice of crust(thick or thin), one meat topping (sausage, pepperoni, or ham), and one vegetable topping (peppers, mushrooms, or onions). How many different pizzas are possible?

7. You can choose from 4 salads and 6 dressings. You can add chicken, shrimp, or neither. Find the number of different salad choices using the counting principle.

8. Your lock has a 3-digit combination. If the digits can be repeated, what is the probability that your combination is 007?

9. A customer ID consists of 3 digits followed by 2 letters. How many different customer IDs are possible if the digits and letters can be repeated?

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<u>13.4 Permutations</u>

10. How many ways can you arrange 5 books on a shelf?

11. How many ways can you arrange the letters in the word MATH?

12. There are 10 runners in a race. How many ways can 1st, 2nd, and 3rd place be awarded?

13. How many ways can a judge award, first, and second place at a math fair with 18 entries?

14. How many 3-letter arrangements can be selected from the 7 letters in the word SPEAKER?

15. Evaluate the expression.

a. $7!$

b. $_7P_2$

c. $_8P_3$

d. $_{10}P_3$

e. $_5P_5$

f. $_9P_4$

g. $_6C_2$

h. $_7C_3$

i. $_{10}C_4$

j. $_{20}C_{15}$

k. $_6C_3$

l. $_{12}C_7$

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16. Tell whether the question can be answered using combinations or permutations. Explain your choice, then answer the question.

    a. Eight swimmers in a race. In how many ways can the swimmers finish first, second, and third place?

    b. A restaurant offers 7 different side dishes. In how many different ways can you choose 2 side dishes?

    c. How many ways can you seat 24 people in a classroom?

    d. How many ways can you choose 10 songs from a list of 35 songs?

    e. How many ways can you choose 3 different muffins from a selection of 8 different muffins?

    f. There are 12 softball teams in a tournament. In how many ways can the teams place first, second, third, and fourth?

17. How many ways can 7 horses finish in 1st, 2nd, and 3rd place?

18. If 3 books are selected from 11 books and stacked on top of each other, how many arrangements are possible?

19. How many ways can 3 songs be chosen from a list of 10?

20. A teacher is picking a group of 5 students to present their projects to the class. How many ways can the 5 students be chosen if there are 16 students in the class total?

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<u>13.6 Independent and Dependent Events</u>

Independent Events:

16. A bag contains 9 red marbles, 4 blue marbles, and 7 yellow marbles. Two consecutive draws are made from the bag replacing the first marble. Find the probability of each event.

a. Probability that both marbles are red.

b. The probability that the first marble is yellow and the second is blue.

17. When rolling a number cube with sides 1-6, what is the probability of rolling a 3 both times?

Dependent Events:

18. A box contains 5 purple marbles, 3 green marbles, and 2 orange marbles. Two consecutive draws are made from the box without replacing the first marble. Find the probability of each event.

a. Probability of an orange first and green second.

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b. Probability that both marbles are purple

c. Probability that the first marble is purple and the second is green.