Algebra 2 Unit 10 Group Quiz

1. A sandwich shop has 3 different kinds of bread, 10 sandwich toppings, and 5 kinds of meat. How many different sandwiches are possible if you chose one bread, one topping and one meat?
   \[3 \cdot 10 \cdot 5\]

2. Solve \( \binom{20}{3} \) and write out the formula.
   \[\frac{20!}{(20-3)! \cdot 3!} = \frac{20!}{17! \cdot 3!} \cdot \frac{17!}{3!} = 1,140\]

3. How many different ways are there for 7 students to finish a race coming in first, second, and third place?
   \[7 \cdot 6 \cdot 5\]

4. How many different arrangements of the word GRAVEL are possible if R has to come last?
   \[5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 \cdot 1\]

5. How many 3 symbol codes can be made using @ # $ % & * if repeats are allowed?
   \[6 \cdot 6 \cdot 6\]

6. How many distinguishable permutations are there of the letters MISSISSIPPI?
   \[\frac{11!}{4! \cdot 4! \cdot 2!} = \frac{11!}{4! \cdot 4! \cdot 2!} = 34,650\]

7. How many different ways are there to generate a 3-digit customer code if digits cannot be repeated?
   \[10 \cdot 9 \cdot 8\]
8. How many selections of 3 CD's can be chosen from 15 CD's?
\[
\binom{15}{3} = \frac{15!}{12!3!} = 556
\]

9. A group has 8 men and 4 women. How many ways can a committee of three men and two women be formed?
\[
\binom{8}{3} \cdot \binom{4}{2} = \frac{8!}{5!3!} \cdot \frac{4!}{2!2!} = 70 \cdot 6 = 420
\]

10. How many different 5-symbol arrangements can be made if the first 2 must be from the letters a, b, c, d and the last three must be from the digits 3, 4, 5, 6, 7? (No repeats)
\[4 \cdot 3 \cdot 5 \cdot 4 \cdot 2 = 240\]

11. A jar contains 3 blue marbles, 5 red marbles, 4 yellow marbles, and 2 green marbles. If a single marble is picked at random from the jar, find the probability that a blue or yellow marble is picked.
\[
\frac{2 + 4}{14} = \frac{7}{14} = \frac{1}{2}
\]

12. There are 6 nickels, 8 dimes, and 4 pennies in a purse. Suppose two coins are selected, without replacing the first one. What is the probability of selecting a penny and then a nickel?
\[
\frac{4}{18} \cdot \frac{6}{17} = \frac{4}{51}
\]

13. A card is to be selected from a deck of 52 cards. What is the probability that it is a club card or a face card?
\[
\frac{13}{52} + \frac{12}{52} - \frac{3}{52} = \frac{22}{52} = \frac{11}{26}
\]

14. A bag contains 9 blue marbles and 5 red marbles. Three are selected at random without replacement. What is the probability that all three are red?
\[
\frac{5}{14} \cdot \frac{4}{13} = \frac{5}{182}
\]

Total = 14
15. What is the probability of selecting a face card followed by a ten from a deck of 52 cards if the first card is not replaced? 

\[ \frac{13}{52} \cdot \frac{4}{51} \]

16. Sally showed four movies from a collection of 8. Find the probability that your favorite movie was shown third.

\[ \frac{1}{8} \cdot \frac{1}{7} \cdot \frac{1}{6} \cdot \frac{1}{5} = \frac{1}{56} \]

17. Identify if the event is independent or dependent. Selecting at random a shirt and then selecting at random a pair of pants.

17. independent

18. The table below contains information about the employees at one business.

<table>
<thead>
<tr>
<th>Education</th>
<th>Under 40,000</th>
<th>40,000 to 60,000</th>
<th>Over 60,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school Diploma</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>College Degree</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>15</td>
<td>20</td>
</tr>
</tbody>
</table>

Find the probability that a person earns over 60,000 given they have a high school diploma.

\[ P(\text{over } 60,000 | \text{ h.s. dip}) = \frac{1}{8} \]

19. John is buying a new car. It is either a Mustang or a Monte Carlo. What is the probability he’d choose a Monte Carlo if the probability he’d choose an automatic Mustang is 33%?

- Mustang 44% automatic (75%)
- Mustang 44% manual (25%)
- Monte Carlo 80% automatic (88%)
- Monte Carlo 16% manual (12%)

\[ \frac{.75 \times .33}{.75} = .44 \]

\[ X = .44 \]
20. How many distinguishable permutations are there of the letters G R A P H

\[ 5! \]
\[ 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 \]

21. The letters A, B, C, D, E are written on slips of paper and put into an envelope. Find the probability they are pulled in alphabetical order.

\[ \frac{1}{5} \cdot \frac{1}{4} \cdot \frac{1}{3} \cdot \frac{1}{2} \cdot \frac{1}{1} \]

22. In a small town the ethnic and religious backgrounds of the townspeople are as shown.

<table>
<thead>
<tr>
<th></th>
<th>Italian</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catholic</td>
<td>120</td>
<td>130</td>
</tr>
<tr>
<td>Baptist</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

\[ \frac{250}{550} \cdot \frac{5}{11} \]

a. \( P (\text{Catholic}) \)

\[ \frac{130}{550} \]

b. \( P (\text{Catholic and Spanish}) \)

c. \( P (\text{Catholic or Spanish}) \)

d. \( P (\text{Baptist} \mid \text{Italian}) \)