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**Basic Statistics
Permutation and Combination**

Name: _____ Score: _____
 Course and Year: _____ Date: _____

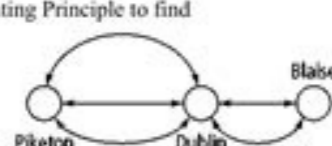
1. Write the letter of the correct answer. Use capital letter for your answers. (20 points)

1. License plates are made using 3 letters followed by 4 digits. How many plates can be made if repetition of letters and digits is allowed?
 - A. 12,000
 - B. 87,600
 - C. 468,000
 - D. 8,760
2. There are 20 students. Four of these students are selected to attend four different conferences. The first student selected will go to a conference in Miami city, the second will go to Pensacola city, the third to Tallahassee city and the fourth to Gainesville city. How many such selections are possible?
 - A. 190
 - B. 19,000
 - C. 100,000
 - D. 980,000
3. A computer password is made up of four characters. Each character can be a capital letter (A through Z), a lowercase letter (a through z) or a digit (0 through 9). How many different such computer passwords are there?
 - A. 4^4
 - B. 14,778,000
 - C. 264
 - D. 800,000
4. If 11 new math books are randomly selected, how many different gender sequences are possible?
 - A. 99
 - B. 90
 - C. 101
 - D. 1048
5. A college has thirteen instructors qualified to teach a special computer laboratory course which requires two instructors to be present. How many different pairs of instructors could there be?
 - A. 78
 - B. 168
 - C. 70
 - D. 68
6. A shirt company has 4 designs, each of which can be made with short or long sleeves. There are 3 color patterns available. How many different types of shirts are available from the company?
 - A. 11
 - B. 60
 - C. 48
 - D. 9
7. Given a group of 8 women and 11 men, how many different ways are there of choosing one man and one woman for a committee?
 - A. 187
 - B. 162
 - C. 19
 - D. 89
8. Given a committee of 8 women and 11 men, find the different ways of choosing a president, a secretary and a treasurer, if the president must be a woman and the secretary and treasurer must be men. Assume no one can hold more than one position.
 - A. 880
 - B. 7,874
 - C. 888
 - D. 456

Name _____ Class _____ Date _____

12-6 Practice Form G
 Permutations and Combinations

1. A six-character license plate number can begin with any two letters and end with four one-digit numbers.
 - a. How many possible choices are there for the first two characters? For the last four characters?
 - b. How many different six-character license plate numbers are possible?



2. Use the map at the right and the Multiplication Counting Principle to find each of the following:
 - a. the number of routes from Picketon to Dublin
 - b. the number of routes from Picketon to Blaise
 - c. the number of routes from Blaise to Picketon
3. Six runners are available for the 400-meter relay. Four runners are needed to run 100 m a piece, in a specified order. How many different runner lineups can the coach consider for the relay with one of each?
4. A restaurant's menu offers 8 different sandwiches and 5 side dishes. How many lunch combinations can you order?

Find the value of each expression.

- | | | | |
|---------------|---------------|---------------|---------------|
| 5. P_2 | 6. P_3 | 7. P_4 | 8. ${}_3P_3$ |
| 9. ${}_3P_4$ | 10. ${}_3P_3$ | 11. ${}_3P_3$ | 12. ${}_3P_3$ |
| 13. ${}_3P_3$ | 14. ${}_3P_3$ | 15. ${}_3P_3$ | 16. ${}_3P_3$ |

17. There are 100 songs on your music player. In how many different ways can you arrange 20 songs to listen to while exercising?

Find the value of each expression.

- | | | | |
|---------------|---------------|---------------|---------------|
| 18. ${}_3C_2$ | 19. ${}_3C_3$ | 20. ${}_3C_3$ | 21. ${}_3C_3$ |
| 22. ${}_3C_3$ | 23. ${}_3C_3$ | 24. ${}_3C_3$ | 25. ${}_3C_3$ |
| 26. ${}_3C_3$ | 27. ${}_3C_3$ | 28. ${}_3C_3$ | 29. ${}_3C_3$ |

**Permutations and Combinations Worksheet
 Answer Key**
As a Matter of Factorial...

1. How many ways are there to order 5 books on a shelf?
 $5! = 120$
2. Simplify ${}_5P_5$.
 $5! = 120$
3. How many ways can we order 6 computers if we have only space for 3?
 $\frac{6!}{3!} = 120$
4. How many ways can we order 8 swimsuits in 4 lockers?
 $\frac{8!}{4!} = 1680$
5. How many ways can we choose 4 t-shirts from 6 t-shirts with repetitions allowed?
 $6^4 = 1296$
6. How many 10-digit phone numbers are there?
 10^{10}
7. How many playlists can we make with 38 songs if we can repeat 5 songs in each playlist?
 ${}_{38}P_5 = 38 \times 37 \times 36 \times 35 \times 34$
8. How many combinations of playlists can we make with 10 songs when there are 5 songs in each and order does not matter?
 ${}_{10}C_5 = \frac{10!}{5!5!}$
9. A drawer contains 6 white t-shirts and 2 red ones. If 2 shirts are drawn at random, what is the probability of getting 2 white shirts?
 $\frac{2!}{6!} = \frac{1}{15}$
10. There are 10 pink, 15 purple, and 5 green jelly beans in a jar. If two jelly beans are drawn at random (without replacement) what is the probability that both are green?
 $\frac{5!}{2!3!} = \frac{2}{15}$



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