1. A math club has 30 boys and 20 girls. Which expression represents the total number of different 5-member teams, consisting of 3 boys and 2 girls, that can be formed?

A. ${}_{30}P_3 \cdot {}_{20}P_2$
B. ${}_{30}C_3 \cdot {}_{20}C_2$
C. ${}_{30}P_3 + {}_{20}P_2$
D. ${}_{30}C_3 + {}_{20}C_2$

2. Which expression represents the total number of different 11-letter arrangements that can be made using the letters in the word "MATHEMATICS"?

A. $\frac{11!}{3!}$
B. $\frac{11!}{2!+2!+2!}$
C. $\frac{11!}{8!}$
D. $\frac{11!}{2!\cdot 2!\cdot 2!}$

3. Which problem involves evaluating ${}_6P_4$?

A. How many different four-digit ID numbers can be formed using 1, 2, 3, 4, 5, and 6 without repetition?
B. How many different subcommittees of four can be chosen from a committee having six members?
C. How many different outfits can be made using six shirts and four pairs of pants?
D. How many different ways can one boy and one girl be selected from a group of four boys and six girls?

4. There are eight people in a tennis club. Which expression can be used to find the number of different ways they can place first, second, and third in a tournament?

A. ${}_8P_3$
B. ${}_8C_3$
C. ${}_8P_5$
D. ${}_8C_5$

5. Three marbles are to be drawn at random, without replacement, from a bag containing 15 red marbles, 10 blue marbles, and 5 white marbles. Which expression can be used to calculate the probability of drawing 2 red marbles and 1 white marble from the bag?

A. $\frac{{}_{15}C_2 \cdot {}_5C_1}{{}_{30}C_3}$
B. $\frac{{}_{15}P_2 \cdot {}_5P_1}{{}_{30}C_3}$
C. $\frac{{}_{15}C_2 \cdot {}_5C_1}{{}_{30}P_3}$
D. $\frac{{}_{15}P_2 \cdot {}_5P_1}{{}_{30}P_3}$

6. The principal would like to assemble a committee of 8 students from the 15-member student council. How many different committees can be chosen?

A. 120
B. 6,435
C. 32,432,400
D. 259,459,200

7. Twenty different cameras will be assigned to several boxes. Three cameras will be randomly selected and assigned to box *A*. Which expression can be used to calculate the number of ways that three cameras can be assigned to box *A*?

A. 20!
B. $\frac{20!}{3!}$
C. ${}_{20}C_3$
D. ${}_{20}P_3$

8. If the Math Olympiad Club consists of eighteen students, how many different teams of four students can be formed for competitions?

A. 66
B. 72
C. 3,060
D. 73,440

9. A committee of five members is to be randomly selected from a group of nine freshmen and seven sophomores. Which expression represents the number of different committees of three freshmen and two sophomores that can be chosen?

A. ${}_9C_3 + {}_7C_2$
B. ${}_9C_3 \cdot {}_7C_2$
C. ${}_{16}C_3 \cdot {}_{16}C_2$
D. ${}_9C_3 \cdot {}_7P_2$

10. In a game, each player receives 5 cards from a deck of 52 different cards. How many different groupings of cards are possible in this game?

A. ${}_{52}P_5$
B. ${}_{52}C_5$
C. $\frac{52!}{5!}$
D. 5!

11. How many different five-member teams can be made from a group of eight students, if each student has an equal chance of being chosen?

A. 40
B. 56
C. 336
D. 6,720

12. There are 12 people on a basketball team, and the coach needs to choose 5 to put into a game. How many different possible ways can the coach choose a team of 5 if each person has an equal chance of being selected?

A. ${}_{12}P_5$
B. ${}_5P_{12}$
C. ${}_{12}C_5$
D. ${}_5C_{12}$

13. How many different four-person committees can be formed from a group of six boys and four girls?

A. $\frac{10!}{4!}$
B. ${}_{10}P_4$
C. ${}_6C_2 \times {}_4C_2$
D. ${}_{10}C_4$