Pre-Calculus Sec 10-1 Extra Practice Name_____

Determine whether the following represent a combination or a permutation, then solve.

1) In a math class of 26 students, the teacher must choose most improved and top math student.

$26P_2 = 650$

2) A principal must choose three math teachers to attend a summer seminar. There are 11 math teachers.

$11C_3 = 165$

3) A bank must downsize. The owner must choose 8 employees to let go. The bank employs 45 people.

$45C_8 = 215,553,195$

4) Four lucky people will be chosen for an upgrade at a concert. There are 25,000 people attending the concert.

$25{,}000C_4 = 1.63 \times 10^{16}$

5) There are 250 people in line for a roller coaster. Five people will be chosen to move to the front of the line and ride 1st, 2nd, 3rd, 4th and 5th.

$250P_5 = 9.38 \times 10^{11}$

6) A lottery ticket contains 5 numbers from 1-100, followed by 2 letters from the alphabet.

a) How many different lottery tickets can be made?

$100C_5 \cdot 26C_2$

2.45×10^{10}

b) What is the probability of choosing the Winning ticket?

$\frac{1}{2.45 \times 10^{10}} = 4.08 \times 10^{-11}$

$= 4.08 \times 10^{-9}\,\%$

7) Evaluate the following. Use the formula (show your work), then check using your calculator.

a) $_{10}C_5$ $\quad \frac{10P_5}{5!} = \frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \frac{30240}{120} = 252$

b) $_{12}C_3$ $\quad \frac{12P_3}{3!} = \frac{12 \cdot 11 \cdot 10}{3 \cdot 2 \cdot 1} = \frac{1320}{6} = 220$

8) A cafeteria offers 5 choices of meat, 6 veggies, and 8 desserts. In how many ways can 2 meats, 3 veggies and 4 desserts be chosen?

$5C_2 \cdot 6C_3 \cdot 8C_4 = 14{,}000$

9) A meeting involves 10 social studies teachers, 11 math teachers, 10 science teachers and 9 English teachers.

a) A committee must contain 2 teachers from each subject. How many different committees can be formed?

$$_{10}C_2 \cdot {}_{11}C_2 \cdot {}_{10}C_2 \cdot {}_{9}C_2 = \boxed{4{,}009{,}500}$$

b) If a committee must contain 8 teachers, what is the probability that the committee contains exactly 2 teachers from each subject?

$$\frac{4{,}009{,}500}{{}_{40}C_8} = \boxed{0.052 = 5.2\%}$$

10) A bag contains 15 red blocks, 13 green blocks and 8 white blocks. If 9 blocks are randomly chosen, what is the probability that exactly 4 are red, 2 are green and 3 are white?

$$\frac{{}_{15}C_4 \cdot {}_{13}C_2 \cdot {}_{8}C_3}{{}_{36}C_9} = \frac{5{,}962{,}320}{94{,}143{,}280} = \boxed{\begin{array}{l}0.063\\ = 6.3\%\end{array}}$$

11) From a deck of 52 cards, 3 cards are drawn. What is the probability that all three cards are Jacks?

$$\frac{{}_{4}C_3}{{}_{52}C_3} = \frac{4}{22{,}100} = \boxed{\begin{array}{l}1.81 \times 10^{-4} = 0.000181\\ = 0.0181\%\end{array}}$$

12) From a deck of 52 cards, 5 cards are drawn. What is the probability that exactly 2 are aces and 3 are Kings?

$$\frac{{}_{4}C_2 \cdot {}_{4}C_3}{{}_{52}C_5} = \frac{6 \cdot 4}{2{,}598{,}960} = \boxed{\begin{array}{l}9.23 \times 10^{-6}\\ = 9.23 \times 10^{-4}\%\end{array}}$$