Algebra 2 Name_____

Permutations

Evaluate each expression.

1) ${}_7P_2$

2) ${}_6P_5$

3) ${}_5P_2$

4) ${}_4P_3$

Find the number of possibilities in each scenario.

5) A team of 12 lacrosse players needs to choose a captain and co-captain.

6) The batting order for ten players on a 12 person team.

7) A group of 50 people are going to run a race. The top three runners earn gold, silver, and bronze medals.

8) The batting order for nine players on a 10 person team.

9) A group of 20 people are going to run a race. The top three runners earn gold, silver, and bronze medals.

10) A group of 30 people are going to run a race. The top three runners earn gold, silver, and bronze medals.

11) A team of 13 field hockey players needs to choose a captain and co-captain.

12) You are setting the combination on a five-digit lock. You want to use the numbers 12345 but don't care what order they are in.

13) The student body of 40 students wants to elect a president, vice president, secretary, and treasurer.

14) A team of 15 soccer players needs to choose a captain and co-captain.

Find the probability of each event.

15) A nature preserve has a population of eight black bears. They have been tagged #1 through #8, so they can be observed over time. Two of them are randomly selected and captured for evaluation. What is the probability that bears #3 and #5 are captured for evaluation?

16) A technician is launching fireworks near the end of a show. Of the remaining nine fireworks, seven are blue and two are red. If he launches seven of them in a random order, what is the probability that all of them are blue?

17) You've purchased a lottery ticket and your numbers are: 7-6-1. A lottery official randomly selects three balls from a set of eight balls that are numbered from #1 to #8. To win, your numbers must match the selected numbers in order. What is the probability of winning the lottery?

18) A gardener has eleven identical-looking tulip bulbs, of which each will produce a different color tulip. Eight of the colors are unknown, however one will become white, one will become yellow, and one will become pink. She plants them abitrarily in a row. When the flowers start to bloom, what is the probability that the yellow one is first in the row, the white one is second, and the pink one is at the end of the row?

19) A nature preserve has a population of thirteen black bears. They have been tagged #1 through #13, so they can be observed over time. Two of them are randomly selected and captured for evaluation. What is the probability that bears #3 and #5 are captured for evaluation?

20) A technician is launching fireworks near the end of a show. Of the remaining ten fireworks, six are blue and four are red. If she launches six of them in a random order, what is the probability that all of them are blue?

Find the number of unique permutations of the letters in each word.

21) CANNON

22) STRUTS

23) PRANCE

24) DEEPEN

25) ACCRUED

26) BANANA

Answers to Permutations

1) 42
2) 720
3) 20
4) 24
5) 132
6) 239,500,800
7) 117,600
8) 3,628,800
9) 6,840
10) 24,360
11) 156
12) 120
13) 2,193,360
14) 210
15) $\frac{1}{28} \approx 3.571\%$
16) $\frac{1}{36} \approx 2.778\%$
17) $\frac{1}{336} \approx 0.298\%$
18) $\frac{1}{990} \approx 0.101\%$
19) $\frac{1}{78} \approx 1.282\%$
20) $\frac{1}{210} \approx 0.476\%$
21) 120
22) 180
23) 720
24) 120
25) 2,520
26) 60

