

Advanced Functions and Modeling

Name: Key

Counting and Probability

Quiz 3

35

1. Ordinarily, all 12 members of a jury must agree before a case can be decided. How many different combinations of 2 members of a jury can cause the jury to be deadlocked?

(3) ${}_{12}C_2$ 66

2. You are planting flowers to line the walkway from your driveway to your porch. You have 11 flowers to plant: 4 are identical marigolds, 3 are identical daisies and 4 are identical tulips. How many ways can they be arranged?

(4) $\frac{11!}{4! \cdot 3! \cdot 4!}$ 11,550

3. How many integers between 3000 and 9999, inclusive, contain no fours?

(3) 6 · 9 · 9 · 9 4374

Simplify.

(2) $\frac{4!6!}{3!} = \frac{2880}{4 \cdot 3 \cdot 2 \cdot 1 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}$
 $\frac{2880}{3 \cdot 2 \cdot 1}$

(2) $(4!)! = 24! = (4 \cdot 3 \cdot 2 \cdot 1)! = (24)!$

(3) $\frac{n!}{(n+2)!} = \frac{1}{(n+2)(n+1)}$
 $\frac{n!}{(n+2)!} = \frac{1}{(n+2)(n+1)n(n-1)(n-2)(n-3) \dots}$

Write in factorial form.

(2) $43 \cdot 42 \cdot 41 \cdot 40 = \frac{43!}{39!}$

(3) $\frac{58 \cdot 57 \cdot 56}{9 \cdot 8 \cdot 7} = \frac{58!}{55!} \cdot \frac{6!}{9!} = \frac{58!}{55!} \cdot \frac{9!}{6!}$

9. A bag contains six blue, four red, and eight white marbles. How many ways can four marbles be selected if exactly two of those selected are red?

(4) ${}^4C_2 \cdot {}^{14}C_2 = 6 \cdot 91 = 546$
 Red NOT Red

10. Using the same bag of marbles from #9, what is the probability of selecting a blue or a white marble out of the bag?

(3) $P(\text{Blue}) = \frac{6}{18}$ $P(\text{white}) = \frac{8}{18}$ $\frac{14}{18} = \frac{7}{9} = 0.77 = 77\%$

11. A baseball team has 17 players, 7 juniors and 10 seniors. In how many different orders can the batting line-up be arranged if 9 players are to bat?

(2) ${}_{17}C_9$ 24,310

12. Using the information from #11, what is the probability that the 9 players to bat will be exactly 4 juniors and 5 seniors?

(4) ${}^7C_4 \cdot {}^{10}C_5 = 35 \cdot 252 = 8820$ $\frac{8820}{24,310} = 0.362 = 36.2\%$