

Name: _____ Period: _____ Date: _____

Permutations and Combinations Bell Work

Solve problems involving permutations and combinations.

1. How many ways can eight displays of different styles be rearranged on a shelf?
2. In how many ways can we rearrange the letters in the word "EXAGGERATE"?
3. How many ways can a president, vice president and secretary be chosen from 5 candidates?
4. In how many ways can Jim, Ben, Anna, Rica and Richard sit in a row, if Ben and Anna are seated next to each other?
5. How many 3 - member committees can be formed from 10 persons?
6. How many ways may 5 girls and 2 boys be arranged in a row of seven seats?
7. How many 5-letter password of distinct characters can be formed using the letters a to z?
8. How many diagonals does a regular nonagon have?

There are 5 males and 4 females. How many 3-member committees can be formed if

9. A committee is composed of all male members?
10. A committee composed of 2 males and a female?

Permutations and Combinations Bell Work

Answer:

Solve problems involving permutations and combinations.

1. How many ways can eight displays of different styles be rearranged on the shelf?

Solution:

$$n = 8, r = 8 \quad {}_8P_8 = 8! = 40320$$

2. In how many ways can we rearrange the letters in the word "EXAGGERATE"?

Solution:

$$n = 10, \text{ where } E = 3, X = 1, A = 2, G = 2, R = 1, T = 1$$

$${}_{10}P_{10} = \frac{10!}{3!1!2!2!1!1!} = 151,200$$

3. How many ways can a president, vice president, and secretary be chosen from 5 candidates?

Solution:

$$n = 5, r = 3$$

$${}_5P_3 = \frac{5!}{(5-3)!} = 60 \text{ ways}$$

4. In how many ways can Jim, Ben, Anna, Rica and Richard sit in a row, if Ben and Anna are seated next to each other?

Solution:

$$\text{Permutation of Jim, (Ben and Anna), Rica and Richard} = 4! \text{ And permutation of Ben and Anna} = 2! \\ (4!)(2!) = 48 \text{ ways}$$

5. How many 3 - member committees can be formed from 10 persons?

Solutions:

$$n = 10, r = 3$$

$${}_{10}C_3 = \frac{10!}{(10-3)!3!} = 120 \text{ ways}$$

6. How many ways can 5 girls and 2 boys be arranged in a row of seven seats?

Solution:

$${}_7P_7 = \frac{7!}{5!2!} = 7 \text{ ways}$$

7. How many 5-letter passwords of distinct characters can be formed using the letters a to z?

Solution:

$$n = 26, r = 5$$

$${}_{26}P_5 = \frac{26!}{(26-5)!} = 7893600 \text{ ways}$$

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8. How many diagonals does a regular nonagon have?

Solution:

Nonagons have 9 points and a diagonal is composed of 2 points. Then $n = 9$, $r = 2$.

$${}_9C_2 = \frac{9!}{(9-2)!2!} = 36$$

There are 5 males and 4 females. How many 3-member committees can be formed if

9. A committee is composed of all male members?

Solution:

$n = 5$, $r = 3$

$${}_5C_3 = \frac{5!}{(5-3)!3!} = 10$$

10. A committee composed of 2 males and a female?

$n = 5$, $r = 2$ and $n = 4$, $r = 1$

$${}_5C_2 = \frac{5!}{(5-2)!2!} = 10 \text{ And } {}_4C_1 = \frac{4!}{(4-1)!1!} = 4$$

$$(10)(4) = 40 \text{ committees}$$