

Name: _____ Period: _____ Date: _____

Permutations and Combinations Assignment

Solve problems involving permutation.

1. How many ways can six books of different titles be rearranged on a shelf?

2. In how many ways can the letters in the word "LOVED" be arranged?

3. In how many ways can four persons A, B, C and D sit in a row where A and B are seated next to each other?

In how many ways can we rearrange the letters in the word

4. EYE?

5. MISSISSIPPI?

6. How many ways can a president and a vice president be chosen from 5 candidates?

7. How many 4-letter password of distinct characters can be formed using the letters a to o?

8. How many ways can two girls and two boys be arranged in a row of four seats?

9. How many 6-letter password of distinct characters can be formed using the letters a to z?

10. In how many ways can five persons A, B, C, D and E sit in a row where B and C are seated next to each other?

Permutations and Combinations Assignment

Solve problems involving combinations.

11. How many ways can students select 5 essay question from 15 questions?

12. How many 4 - member committees can be formed from 10 persons?

13. How many diagonals does a regular octagon have?

There are 8 males and 6 females. How many 5-member committees can be formed if

14. A committee is composed of all male members?

15. A committee is composed of female members?

16. A committee composed of 3 males and 2 females?

17. A committee is composed of 4 males and a female?

18. In how many ways may a class of 10 students select three delegates for that class?

19. A store has prepared 6 different displays for Christmas. There are only three display windows. Will there be sufficient number of display arrangements for a period of 20 days without repeating any arrangement?

20. How many diagonals does a regular decagon have?

Permutations and Combinations Assignment

Answer:

Solve problems involving permutation.

1. How many ways can six books of different titles are rearranged in the shelf?

$$\text{Solution: } n = 6, r = 6 \quad {}_6P_6 = 6! = 720$$

2. In how many ways can the letters in a word "LOVED" be arranged?

$$\text{Solution: } n = 5, r = 5 \quad {}_5P_5 = 5! = 120$$

3. In how many ways can four persons A, B, C and D sit in a row where A and B are seated next to each other?

Solution:

Permutation of AB, C and D = 3! And permutation of A and B = 2!

$$(3!)(2!) = 12 \text{ ways}$$

In how many ways can we rearrange the letters in the word

4. EYE?

$$\text{Solution: } n = 3, \quad Y = 1, E = 2$$

$${}_3P_3 = \frac{3!}{2! 1!} = 3 \text{ ways}$$

5. MISSISSIPPI?

$$\text{Solution: } n = 11, \quad M = 1, I = 4, S = 4, P = 2$$

$${}_{11}P_{11} = \frac{11!}{4! 4! 2! 1!} = 34,650 \text{ ways}$$

6. How many ways can a president and a vice president be chosen from 5 candidates?

$$\text{Solution: } n = 5, r = 2$$

$${}_5P_2 = \frac{5!}{(5-2)!} = 20 \text{ ways}$$

7. How many 4-letter password of distinct characters can be formed using the letters a to o?

Solution:

$$n = 15, r = 4$$

$${}_{15}P_4 = \frac{15!}{(15-4)!} = 32,760 \text{ ways}$$

8. How many ways may two girls and two boys be arranged in a row of four seats?

Solution:

$${}_4P_4 = \frac{4!}{2! 2!} = 6 \text{ ways}$$

Permutations and Combinations Assignment

9. How many 6-letter passwords of distinct characters can be formed using the letters a to z?

Solution:

$$n = 26, r = 6$$

$${}_{26}P_6 = \frac{26!}{(26 - 6)!} = 165,765,600 \text{ ways}$$

10. In how many ways can five persons A, B, C, D and E sit in a row where B and C are seated next to each other?

Solution:

Permutation of A, BC, D and E = $4!$ And permutation of B and C = $2!$

$$(4!)(2!) = 48 \text{ ways}$$

Solve problems involving combinations.

11. How many ways can students select 5 essay question from 15 questions?

Solution:

$$n = 15, r = 5$$

$${}_{15}C_5 = \frac{15!}{(15 - 5)! 5!} = 3003 \text{ ways}$$

12. How many 4 - member committees can be formed from 10 persons?

Solutions:

$$n = 10, r = 4$$

$${}_{10}C_4 = \frac{10!}{(10 - 4)! 4!} = 210 \text{ ways}$$

13. How many diagonals does a regular octagon have?

Solution:

Octagons have 8 points and a diagonal is composed of 2 points. Then $n = 8, r = 2$.

$${}_8C_2 = \frac{8!}{(8 - 2)! 2!} = 20$$

There are 8 males and 6 females. How many 5-member committees can be formed if

14. A committee is composed of all male members?

Solution:

$$n = 8, r = 5$$

$${}_8C_5 = \frac{8!}{(8 - 5)! 5!} = 56$$

Permutations and Combinations Assignment

15. A committee is composed of female members?

Solution:

$$n = 6, r = 5$$

$${}_6C_5 = \frac{6!}{(6-5)!5!} = 6$$

16. A committee composed of 3 males and 2 females?

$$n = 8, r = 3 \text{ and } n = 6, r = 2$$

$${}_8C_3 = \frac{8!}{(8-3)!3!} = 56 \text{ And } {}_6C_2 = \frac{6!}{(6-2)!2!} = 15$$

$$(56)(15) = 840 \text{ committees}$$

17. A committee is composed of 4 males and a female?

$$n = 8, r = 4 \text{ and } n = 6, r = 1$$

$${}_8C_4 = \frac{8!}{(8-4)!4!} = 70 \text{ And } {}_6C_1 = \frac{6!}{(6-1)!1!} = 6$$

$$(70)(6) = 420 \text{ committees}$$

18. In how many ways may a class of 10 students select three delegates for that class?

Solution:

$$n = 10, r = 3$$

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

19. A store has prepared 6 different displays for Christmas. There are only three display windows. Will there be sufficient number of display arrangements for a period of 20 days without repeating any arrangement?

Solution:

$$n = 6, r = 3$$

$${}_6C_3 = \frac{6!}{(6-3)!3!} = 20 \text{ ways}$$

Yes, there will be enough arrangement for 20 days.

20. How many diagonals does a regular decagon have?

Solution:

Decagon have 10 points and a diagonal is composed of 2 points. Then $n = 10, r = 2$.

$${}_{10}C_2 = \frac{10!}{(10-2)!2!} = 45$$