A2.S.10: Permutations: Calculate the number of possible permutations of n items taken r at a time

1 Which value is equivalent to ${}_3P_3$?
1) 1
2) 9
3) 3!
4) 27

2 A four-digit serial number is to be created from the digits 0 through 9. How many of these serial numbers can be created if 0 can *not* be the first digit, no digit may be repeated, and the last digit must be 5?
1) 448
2) 504
3) 2,240
4) 2,520

3 How many different six-letter arrangements can be made using the letters of the word "TATTOO"?
1) 60
2) 90
3) 120
4) 720

4 What is the total number of different nine-letter arrangements that can be formed using the letters in the word "TENNESSEE"?
1) 3,780
2) 15,120
3) 45,360
4) 362,880

5 How many different 11-letter arrangements are possible using the letters in the word "ARRANGEMENT"?
1) 2,494,800
2) 4,989,600
3) 19,958,400
4) 39,916,800

6 How many distinct ways can the eleven letters in the word "TALLAHASSEE" be arranged?
1) 831,600
2) 1,663,200
3) 3,326,400
4) 5,702,400

7 Which formula can be used to determine the total number of different eight-letter arrangements that can be formed using the letters in the word *DEADLINE*?
1) 8!
2) $\frac{8!}{4!}$
3) $\frac{8!}{2!+2!}$
4) $\frac{8!}{2!\cdot 2!}$

Name: _____

8 Which expression represents the number of different 8-letter arrangements that can be made from the letters of the word "SAVANNAH" if each letter is used only once?

1) $\frac{8!}{5!}$
2) $\frac{8!}{3!2!}$
3) ${}_8P_5$
4) $8!$

9 Which expression represents the total number of different 11-letter arrangements that can be made using the letters in the word "MATHEMATICS"?

1) $\frac{11!}{3!}$
2) $\frac{11!}{2!+2!+2!}$
3) $\frac{11!}{8!}$
4) $\frac{11!}{2!\cdot 2!\cdot 2!}$

10 The number of possible different 12-letter arrangements of the letters in the word "TRIGONOMETRY" is represented by

1) $\frac{12!}{3!}$
2) $\frac{12!}{6!}$
3) $\frac{{}_{12}P_{12}}{8}$
4) $\frac{{}_{12}P_{12}}{6!}$

11 Find the total number of different twelve-letter arrangements that can be formed using the letters in the word *PENNSYLVANIA.*

12 Find the number of possible different 10-letter arrangements using the letters of the word "STATISTICS."

13 Determine how many eleven-letter arrangements can be formed from the word "CATTARAUGUS."

14 The letters of any word can be rearranged. Carol believes that the number of different 9-letter arrangements of the word "TENNESSEE" is greater than the number of different 7-letter arrangements of the word "VERMONT." Is she correct? Justify your answer.

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Answer Section

1 ANS: 3 REF: 010713a

2 ANS: 1

$8 \times 8 \times 7 \times 1 = 448$. The first digit cannot be 0 or 5. The second digit cannot be 5 or the same as the first digit. The third digit cannot be 5 or the same as the first or second digit.

REF: 011125a2

3 ANS: 1

$\frac{{}_6P_6}{3!2!} = \frac{720}{12} = 60$

REF: 011324a2

4 ANS: 1

$\frac{{}_9P_9}{4! \cdot 2! \cdot 2!} = \frac{362,880}{96} = 3,780$

REF: 061511a2

5 ANS: 1

$\frac{{}_{11}P_{11}}{2!2!2!2!} = \frac{39,916,800}{16} = 2,494,800$

REF: 011518a2

6 ANS: 1

$\frac{{}_{11}P_{11}}{3!2!2!2!} = \frac{39,916,800}{48} = 831,600$

REF: 081512a2

7 ANS: 4 REF: fall0925a2

8 ANS: 2 REF: 080727a

9 ANS: 4 REF: 011409a2

10 ANS: 3

$2! \cdot 2! \cdot 2! = 8$

REF: 061425a2

11 ANS:

39,916,800. $\frac{{}_{12}P_{12}}{3! \cdot 2!} = \frac{479,001,600}{12} = 39,916,800$

REF: 081035a2

12 ANS:

$\frac{{}_{10}P_{10}}{3!\cdot 3!\cdot 2!} = \frac{3,628,800}{72} = 50,400$

REF: 061330a2

13 ANS:

$\frac{11!}{3!\cdot 2!\cdot 2!} = 1,663,200$

REF: 011631a2

14 ANS:

No. TENNESSEE: $\frac{{}_9P_9}{4!\cdot 2!\cdot 2!} = \frac{362,880}{96} = 3,780$. VERMONT: ${}_7P_7 = 5,040$

REF: 061038a2