

Assignment

1. How many arrangements could be made of the word ⁽⁵⁾
- a) FATHER if F is first? b) UNCLE if C is first and L is last?

$$\underline{F} \underline{6!} \text{ --- } = 120$$

$$\underline{C} \underline{3!} \text{ --- } \underline{L} = 6$$

c) DAUGHTER ⁽⁸⁾ if UG is last?

$$\underline{6!} \text{ --- } \underline{UG} = 120$$

d) MOTHER if the vowels are first and last?

$$\underline{2} \underline{4!} \text{ --- } \underline{L} = 48$$

OIE

2. How many arrangements of the following words can be made if all the vowels → can reorganize vowels must be kept together?

a) FATHER

AE 2V 4C

$$\underline{AE} \text{ --- } = 2! \times 5! =$$

b) DAUGHTER

3V

$$\underline{AUE} \text{ --- } = 3! \times 6! =$$

c) EQUATION

take vowels as a unit.

$$\underline{EUAIO} \text{ --- } = 5! \times 4! =$$

3. Determine the number of different arrangements of the six letters in the word ANSWER
- a) without restrictions b) that begin with an S

$$6! = 720$$

$$\underline{S} \underline{5!} \text{ --- } = 120$$

- c) that begin with a vowel and end with a consonant

$$\underline{2} \underline{4} \underline{3} \underline{2} \underline{1} \underline{4} = 192$$

$$2 \times 4! \times 4 =$$

- d) that have the three letters A, N, and S adjacent and in the order ANS

$$\underline{ANS} \text{ --- } = 4! = 24$$

- e) that have the three letters A, N, and S adjacent but not necessarily in that order

$$\underline{ANS} \text{ --- } = 3! \times 4! = 144$$

4. Consider the letters of the word **HEXAGON**.

a) In how many ways can the letters of the word **HEXAGON** be arranged using all the letters?

$$\underline{7} \underline{6} \underline{5} \underline{4} \underline{3} \underline{2} \underline{1} \text{ or } 7! = 5040$$

b) How many arrangements of the letters of the word **HEXAGON** begin with an 'H'?

$$\underline{H} \underline{6} \underline{5} \underline{4} \underline{3} \underline{2} \underline{1} \text{ or } 6! = 720$$

c) How many arrangements of the letters of the word **HEXAGON** begin with a vowel?

$$\underline{3} | \underline{6} \underline{5} \underline{4} \underline{3} \underline{2} \underline{1} \text{ or } 3 \times 6! = 2160$$

d) How many 3-letter "words" can be made from the letters of the word **HEXAGON**?

$$\underline{7} \underline{6} \underline{5} \text{ or } 7^P_3 = 210$$

e) How many 3-letter "words" beginning with a vowel can be made from the letters of the word **HEXAGON**?

$$\underline{3} \underline{6} \underline{5} \text{ or } 3 \times 6^P_2 = 90$$

Vowel

f) How many 3-letter "words" can be made from the letters of the word **HEXAGON** if every "word" must have the pattern consonant-vowel-consonant?

$$\underline{4} \underline{3} \underline{3} = 36$$

C V C

5. In how many ways can four adults and five children be arranged in a single line

a) without restriction? *9 ppl total*

$$9! = 362880$$

b) if children and adults are alternated?

$$\underline{C} \underline{A} \underline{C} \underline{A} \underline{C} \underline{A} \underline{C} \underline{A} \underline{C}$$

$$5! \cdot 4! = 2880$$

children adult

c) if the adults are all together and the children are all together?

$$\underline{5!} \text{ --- } | \text{ --- } \underline{4!}$$

↖ ↗ swap 2!

$$5! \cdot 4! \cdot 2! = 5760$$

d) if the adults are all together?

$$\underline{\underline{4!}} \text{ --- } | \text{ --- } \text{ --- } \text{ --- } \text{ ---}$$

adults

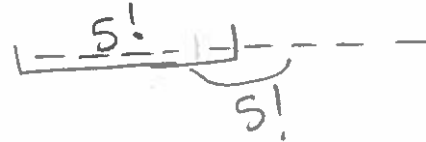
$$4! \cdot 6! = 17280$$

Use the following information to answer the next three questions.

The starting line up of a school mixed softball team consists of four boys and five girls. Before the game, the nine students line up in a row for a photograph.

10. The number of different arrangements if the girls all stand together is given by

- A. $4! \times 5!$ **B.** $5! \times 5!$
 C. $4! \times 5! \times 2!$ D. $5! \times 5! \times 2!$

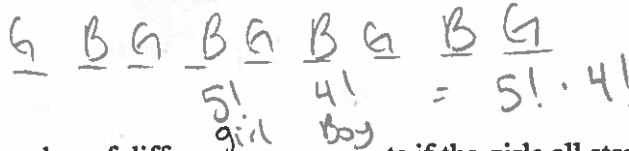


Numerical Response

11. The number of different arrangements if the girls and boys alternate in the row is _____.

(Record your answer in the numerical response box from left to right.)

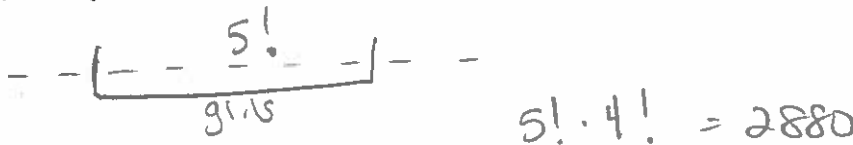
2	8	8	0
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12. The number of different arrangements if the girls all stand together in the middle of the row is _____.

(Record your answer in the numerical response box from left to right.)

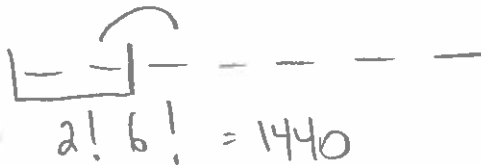
2	8	8	0
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13. The number of different ways that seven basketball players can be seated on a bench so that two specified players are always sitting side by side is _____.

(Record your answer in the numerical response box from left to right.)

1	4	4	0
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Answer Key

1. a) 120 b) 6 c) 720 d) 48 2. a) 240 b) 4320 c) 2880
 3. a) 720 b) 120 c) 192 d) 24 e) 144
 4. a) 5040 b) 720 c) 2160 d) 210 e) 90 f) 36
 5. a) 362 880 b) 2880 c) 5760 d) 17 280 6. a) 48 b) 72
 7. A 8. D 9. C 10. B

11.

2	8	8	0
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 12.

2	8	8	0
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 13.

1	4	4	0
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