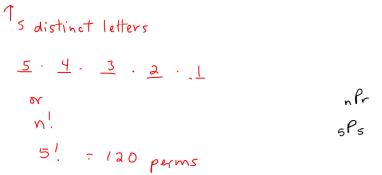
## **Pre-Calculus 12 Permutations of Different Objects**

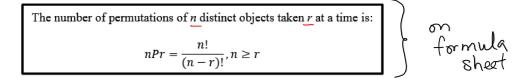
To permute a set of objects means to arrange them.

A permutation is an arrangement of objects in a definite order (order is important)

n! represents the number of permutations of n different/distinct objects

Ex. 1) Given the word PHONE, how many 5-letter permutations of these letters can be created.





Ex. 2) Evaluate 9P4

"Permutation of 9 things taking only 4 at a time"

$$qP_{4} = \frac{q!}{(q-4)!}$$

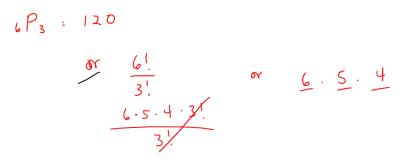
$$= \frac{q!}{5!}$$

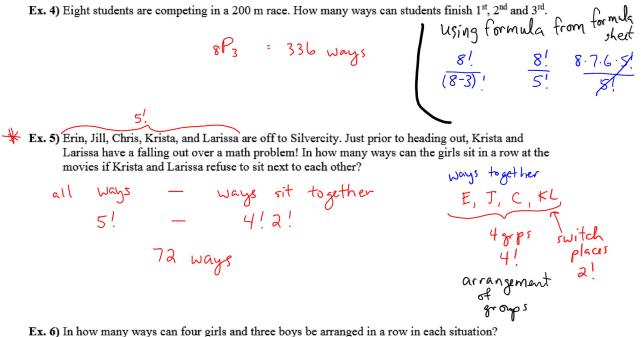
$$= 3024$$
or on Calc  
or on Calc  

$$q nPr \ 4 = 3024$$

$$\int_{could be in MATH}_{options if not a key}$$

Ex. 3) Given the word WINTER how many permutations of three letters are possible.





a) A boy must be at each end of the row.

b) The boys must be together.

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c) The girls must be together.

d) The ends of the row must be either both boys or both girls.

Ex. 7) Solve for *n*: <sub>n</sub>P<sub>2</sub>=56

$$nPr = \frac{n!}{(n-r)!}$$

$$56 = \frac{n!}{(n-2)!}$$

$$56 = \frac{n(n-1)(n-2)!}{(n-2)!}$$

$$0 = n^{2} - n - 56$$

$$0 = (n-8)(n+7)$$

$$n = 8$$

$$n = 7$$

**Ex. 8)** Solve for  $r: {}_{5}P_{r} = 20$ 

$$n r = \frac{n!}{(n-r)!}$$

$$20 = \frac{5!}{(5-r)!}$$

$$20 (5-r)! = 120$$

$$(5-r)! = 6$$

$$3! = 6$$

$$5-3 = r$$

$$3! = 6$$

$$r = 2$$

