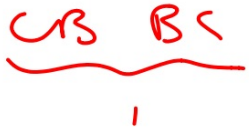
Geometry 13.2
Use permutations with probability
Use combinations with probability

outcome
sample space
factorial (!)
permutation
combination
probability



Yesterday's ET :(
Will go over it today

KeyConcept Factorial

Words	The **factorial** of a positive integer n, written $n!$, is the product of the positive integers less than or equal to n.
Symbols	$n! = n \cdot (n-1) \cdot (n-2) \cdot \ldots \cdot 2 \cdot 1$, where $0! = 1$

eT

~~EMC~~ from Mon.

What is the question?

How to interpret the question...

$GC \cdot 4 \cdot 3 = \frac{1}{12}$

$\frac{1}{6} \cdot \frac{1}{5} = \frac{1}{30}$

$20C_4$

$\frac{1}{20} \cdot \frac{1}{19} \cdot \frac{1}{18} \cdot \frac{1}{17} = \frac{1}{116,280}$

$\frac{\cancel{20}^{5}\ 19\ \cancel{18}^{3}\ 17}{\cancel{4 \cdot 3 \cdot 2 \cdot 1}} = \frac{1}{4845}$

Example 2 Probability and ${}_nP_r$

A class is divided into teams each made up of 15 students. Each team is directed to select team members to be officers. If Sam, Valencia, and Deshane are on a team, and the positions are decided at random, what is the probability that they are selected as president, vice president, and secretary, respectively?

PsxPvxPd

$\frac{1}{15} \cdot \frac{1}{14} \cdot \frac{1}{13}$

${}_{15}P_3$

Number of arrangements vs probability

Permutations with repetition

palomino $\frac{8!}{2!}$ $\frac{8\,7\,6\,5\,4\,3\,2\,1}{2\,1}$ 20,160

international $\frac{13!}{(2!\,3!\,2!\,2!)}$ $13\,12\,11\,10\,9\,8\,7\,6\,5\,4\,3\,2\,1$ $= 129{,}729{,}600$

mathematics

$5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$

120

1·~~5~~·4·3·2·1

Is it a different arrangement?
1*4*3*2*1 Why?

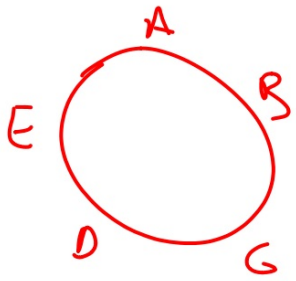
Circular (n-1)

Linear: 5 people in a row

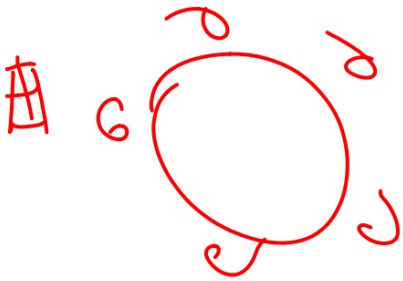
Circular: 5 people at a table
(can it be a square table?)

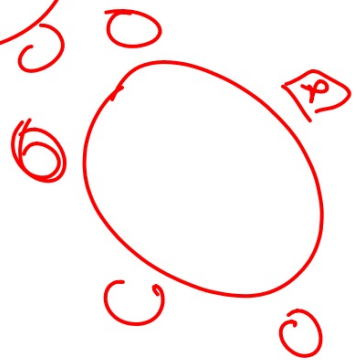
Circular with point of reference
(something different):
5 people at a table...
one chair is purple
one seat is next to a window
one seat has a laptop
etc.

A · B · C · D · E
5 · 4 · 3 · 2 · 1 = 120



1 · 4 · 3 · 2 · 1 = 24



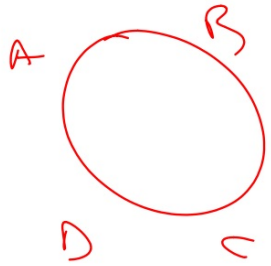


5 4 3 2 1

Quiz 13.1-13.2 Wed.
This is your time to ask for help!

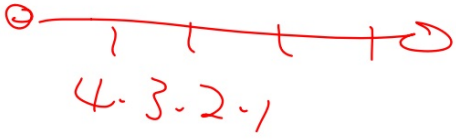
WB 13.2
Sk.
Pr.

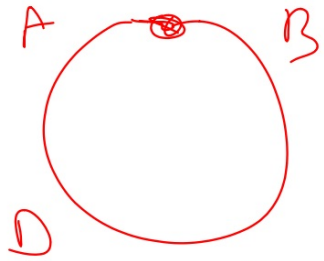
circ.



1.3.2.1

lin.





4.3.2.1