

Today: Wrap up Sec. 11.2, start 11.3

HW: 11.2 #3, 4, 19-22, 25-51 every other odd*, 52.
11.3 #5-12, 15 * already did #33

Quiz on Tuesday (end of class)

Sep 4-8:26 AM

(11.1/34)

a) $\begin{matrix} HHH \\ HHT \\ HTH \\ THH \end{matrix}$ b) $HHHH$

c) ~~HHH~~ $\begin{matrix} HHT \\ HTA \\ THH \end{matrix}$ $\begin{matrix} HTT \\ THT \\ TTA \\ TTT \end{matrix}$

d) $\begin{matrix} HTT \\ THT \\ TTA \\ TTT \end{matrix}$

11.2 # 32) $5 \times 5 \times 5 \times 5 \times 5 = 3125$

Sep 4-11:05 AM

Fundamental Counting Principle

A deli has a lunch special which consists of a sandwich, soup, dessert and drink for \$4.99. They offer the following choices:

Sandwich: chicken salad, ham, and tuna, and roast beef

Soup: tomato, chicken noodle, vegetable

Dessert: cookie and pie

Drink: tea, coffee, coke, diet coke and sprite

How many lunch specials are there?

$$4 \times 3 \times 2 \times 5 = 120$$

Sep 4-8:32 AM

Fundamental Counting Principle

A company places a 6-symbol code on each unit of product. The code consists of 4 digits, the first of which is the number even, followed by 2 letters, the first of which is NOT a vowel. How many different codes are possible if letters and numbers can repeat? If letters and numbers can not repeat?

Repeats
OK

$$\underbrace{5}_{(\text{even})} \times \underbrace{10} \times \underbrace{10} \times \underbrace{10} \times \underbrace{21}_{\text{not vowel}} \times \underbrace{26} = 2,730,000$$

No Repeats

$$\underbrace{5}_{(\text{even})} \times \underbrace{9} \times \underbrace{8} \times \underbrace{7} \times \underbrace{21}_{\text{not vowel}} \times \underbrace{25} = 1,323,000$$

Sep 4-8:34 AM

Factorial Notation

- $n! = n(n-1)(n-2)\dots 3 \cdot 2 \cdot 1$, eg: $5! = 5 \times 4 \times 3 \times 2 \times 1$
so $5! = 120$.

- $0! = 1$

- EX: $\frac{6!}{(10-6)!} = \frac{6 \times 5 \times 4 \times 3 \times 2 \times 1}{(4)!} = \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{4 \cdot 3 \cdot 2 \cdot 1} = 30$

$$5! = 120$$

$$6! = 6(5!) = 720$$

$$(4!)(3!) \stackrel{?}{=} 12!$$

$$(20)(6) \neq 479,001,600$$

$$144$$

Sep 4-8:35 AM

Counting Challenge

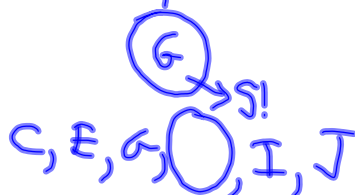
The Teacher Education Club consists of 10 members:

Amy, Beth, Craig, Danielle, Ethan, Francine, George, Hannah, Isaac, and Jon

In how many ways can you line up all 10 Members if all the girls are to stand next to each other?

Hint: treat the girls as one person (at first).

$$\underline{6} \times \underline{5} \times \underline{4} \times \underline{3} \times \underline{2} \times \underline{1}$$



$$6! \times 5! = 720 \times 120 = 86,400$$

Sep 4-8:36 AM

Looking Ahead: Sec. 11.3 Permutations and Combinations

Suppose the Math Club contains five members: {A, B, C, D, and E}

1. How many ways are there to line everyone up for a photograph?

5!

2. How many ways are there to elect a president and secretary?

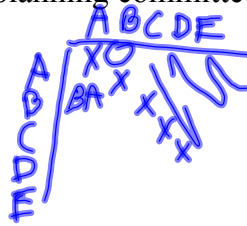
Order matters!

5 x 4

A, B
B, A

3. How many two-person party-planning committees can be created from the members?

Order doesn't matter.



$(5 \times 4) \div 2$
repeats like
AB ; BA
are the same
committee.

Sep 4-8:57 AM

Permutations: How many arrangements are there of 5 things taken 2 at a time? (No repetitions, but order matters)

$$P(n, r)$$

Combinations: How many 2-items subsets can be formed from a set of 5 objects? (No repetitions, but order doesn't matter).

$$C(n, r)$$

Identify which of the following represents a *permutation* and which represents a *combination*.

2. How many ways are there to elect a president and secretary?

3. How many two-person party-planning committees can be created from the members?

Sep 4-9:10 AM

Reflect:

1. What is one question you have about today's material?

2. What is one big point you want to remember about today's lesson?

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11.3 #5-12, 15

Sep 4-9:26 AM