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Biggest new idea today is replacement or not (independent vs. dependent)
Stick with me, first review everything we know then the one new concept
Example:
I have different colored pens - 3 red, 2 green, 4 purple, and 1 blue
(10 total pens)
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**#1)** What is the probability of choosing a red if I pick one pen?

Answer: 3/10 (easy right, because you are a probability boss!)

#2) What is the probability of getting a red or a green if I choose one pen?

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Answer: 5/10 (because "or" means add, so 3+2 = 5 for my top number)
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(Still feeling like a boss, right?)

**#3)** What is the probability of getting a red first, putting it back and then choosing a green?

Answer: 3/50 (because "and" means multiply)

the probability of red is 3/10, and green is 2/10so, I multiply  $3/10 \ge 2/10 = 6/100$  simplified = 3/50OK, so you got all that so far and are totally awesome you are a probability wizard,!!!

New thing today

#4) What is the probability of choosing a red pen, keeping it in your hand and then choosing a green pen?

**Answer: 1/15** 

This is not so tricky, pay attention:

I still have the word "and" so I am still multiplying, the only new thing is how many things I have "total" to pick from for the 2nd pick (my bottom number) So, first pick, probability of red pen = 3/10 (just like always) Now, second pick, I took a red pen away, so I only have 9 pens left for my total. Which means probability of getting green would be 2/9. Finally, I multiply  $3/10 \ge 2/9 = 6/90$  simplified = 1/15 More Examples:

A) I am choosing 2 people from the Jr. High to represent 7<sup>th</sup> and 8<sup>th</sup> grade. There are 28 girls and 18 boys. What is the probability that I choose two boys?

Answer = 17/115

First find the total number of students: 28 + 18 = 46

Next find probability of picking a boy: 18/46

Then find probability of picking a boy: 17/45

(One boy is already chosen on the first pick, so for the next pick we only have 45 people to choose from and one less boy) new total = 45

Multiply the two probabilities together:  $18/46 \times 17/45 = 306/2070$  reduce = 17/115

B) I have 24 students in my class, and I want the probability of randomly choosing a group of two with Many and Aea in it.

First how many possible outcomes do I have?

24 people for the first choice & 23 people possible for the second choice

(because once I choose someone, I don't put him/her back) so total = 23x 24 = 552

Now how many ways can I choose Many and Aea in a group?

2 ways (Many first then Aea, or Aea first then Many), since I don't care who is first, order doesn't matter, I just want those 2 in a group, my answer is 2

So, probability is 2/552 reduce = 1/276