Hi, I'm Greg. I'm a tutor in NYC! I love helping students. I tutor many subjects, assist with homework help, etc. I mainly specialize in specialized/standardized tests.

What is this? I don't always have time to do a livestream, therefore instead I thought it would be fun to do a Problem Of The Day series. In this series I will put up a problem and you guys will then analyze it, and come up with possible solutions and alternative solutions on your own. I'll eventually post the answer. In the past this has resulted in many interesting discussions. Some questions will be easy, others hard, some perhaps with a twist, some will be SHSAT 8 oriented while some SHSAT 9 oriented.

I'll leave a problem up for about an hour, however depending upon the dynamics and complexity of the question it could be much longer. Unlike my AMA (Ask Me Anything) livestream sessions, I may not always be able to join in the discussion. Again, the idea is for you guys to discuss things out.

Please be respectful in this endeavor. Let's keep this fun, educational, and forward-thinking. Keep your comments within this spirit. If needed, feel free to email me at GregsTutoringNYC@gmail.com. Past questions are at https://www.GregsTutoringNYC.com/POTD

HERE'S THE PROBLEM: <———
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In a sample of 50 marbles, 32 are plastic and 15 are blue. Of the blue marbles, 73 1/3% are plastic marbles. If a marble from this sample is selected at random, what is the probability that it is neither plastic nor blue?

HERE'S THE SOLUTION:
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Although this is a probability problem we will solve it via grouping.

Our groups are plastic(P) vs non-plastic(NP), and blue(B) vs non-blue(NB).

Tots reflects totals. Let's set up our 2x2 table:

	B	NB	Tots
P			
NP			
Tots			

$$73\tfrac{1}{3}\% = \frac{220}{3}\% = \frac{220}{3} \times \frac{1}{100} = \frac{2.2}{3} \therefore \frac{2.2}{3} \times \frac{15}{1} = 2.2 \times 5 = 11 \text{ blue plastic marbles.}$$

Filling in our givens:

	B	NB	Tots
P	11		32
NP			
Tots	15		50

If 32 are plastic then 50 - 32 = 18 are non-plastic.

If 15 are blue then 50 - 15 = 35 are non-blue.

If 15 are blue and 11 plastic are blue then 15 - 11 = 4 non-plastic are blue.

	B	NB	Tots

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   P| 11 |    | 32
----+----+-----------
  NP|  4 |    | 18
----+----+-----------
Tots| 15 | 35 | 50
```

We can now fill in the rest of the table:

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      B    NB   Tots
----+----+-----+-----
   P| 11 | 21 | 32
----+----+-----------
  NP|  4 | 14 | 18
----+----+-----------
Tots| 15 | 35 | 50
```

Double check all sums left to right and also up to down.

The question asks what is the probability that it is neither plastic nor blue; that refers to the field with 14 in it. That's 14 out of 50 .: 14/50 = 28/100 = 0.28.

– Greg / GregsTutoringNYC@gmail.com   LLAP ☮