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

As it turns out, I haven't been able to get to do as many livestreams as I have in past years (yet, hopefully that changes). Therefore, I thought it would be fun to start a Problem Of The Day Series. I will put up a problem and leave it running for a while. 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 some manner.

For now we'll play it by ear how that will happen and for how long I'll leave up a problem. But right now I'm thinking of keeping the problem up maybe 2 hours minimum and maybe even in some cases 4 or 5 hours depending upon the dynamics and my situation. Unlike my AMA (Ask Me Anything) lifestream sessions, I will not be checking in every few minutes although I may from time to time join into the discussion. Again, the idea is for you guys to discuss out the problem.

Please be respectful to each other in this endeavor and let's make this fun, educational and forward-thinking. Keep the comments within the spirit of what I'm doing here. Please email me at GregsTutoringNYC@gmail.com if needed.

HERE'S THE PROBLEM: <————
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If 2 popcorns and 4 drinks cost $26, and 6 popcorns and 8 drinks cost $62, how much is 6 popcorns and 12 drinks?

HERE'S THE SOLUTION:
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p represents the price of popcorn
d represents the price of drinks

"2 popcorns and 4 drinks cost $26" can be represented as:

a) 2p + 4d = 26

"6 popcorns and 8 drinks cost $62" can be represented as:

b) 6p + 8d = 62

We need to metabolize these two truisms against each other. One way is to "compare" these two equations against each other. Let's just put them next to each other for starters:

2p + 4d = 26
6p + 8d = 62

(more on next page)

One way to solve this is to establish the same number of popcorns or the same number of drinks. For instance if we could get the first equation to involve 6 popcorns or 8 drinks then we could "interact it" with the second equation. If we were to pick targeting it for 8 drinks (we could have targeted it for 6 popcorns) we could do that by multiplying every term in (a) by 2:

2(2p + 4d = 26)
yields
a') 4p + 8d = 52

Now if we list these two equations ((a') and (b)):

6p + 8d = 62
4p + 8d = 52

we see that they both have an 8d. So let's subtract them:

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  6p + 8d = 62
- 4p + 8d = 52
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  2p  +0  = 10
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That leaves us with 2p = 10 .: p = 5

If we plug p = 5 in both equations, we can see that we can get d = 4
To double check in the original equations:
2p + 4d = 26
2x5 + 4x4 = 10 + 16 = 26

6p + 8d = 62
5x6 + 8x4 = 30 + 32 = 62

The question asks: how much is 6 popcorns and 12 drinks? That is represented as:

6p + 12d = x

Since we now know p and d, we get:

6x5 + 12x4 = 30 + 48 = $78

We solved this by making the coefficient of d in each equation the same and solving for p. We could have also solved by making p have the same coefficient in both equations:

3(2p + 4d = 26)
yields
6p + 12d = 78

Subtracting we get:

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  6p + 12d = 78
- 6p +  8d = 62
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        4d = 16 .: d = 4
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And the rest works as previous, the only difference here is that we solved for d and earlier we solved for p.

This can work via division too; for instance we could divide (b) by 2 yielding:
b') 3p + 4d = 31
Subtracting (a) from (b') yields p = 5

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For a different solution approach, we could have also taken either (a) or (b), wrote out what p= or d= equals and substituted that into the other equation. So again if these are our equations:

a) 2p + 4d = 26
b) 6p + 8d = 62

Let's pick solving for p in (a) and then using that to solve for d in (b):

2p + 4d = 26
2p = 26 − 4d
p = 13 − 2d

Now substitute in (b), remembering to honor order of evaluation ("PEMDAS"):

6p + 8d = 62
6(13 − 2d) + 8d = 62
78 − 12d + 8d = 62
78 − 4d = 62
78 − 62 = 4d
16 = 4d
4 = d

And again all as before. Instead of solving for p in (a) and substituting to solve for d in (b) as just done above, we could have also solved for d in (a) and substituted to solve for p in (b), as well as, solving for p in (b) and substituting to solve for d in (a), and solving for d in (b) and substituting to solve for p in (a). (That's a mouthful but spend a moment to think it through.)

This all said (whew!!), there is still another way so solve this. Please note that if you go back to the question, it tells us:

c) 2 popcorns and 4 drinks cost $26

And asks us how much is

d) 6 popcorns and 12 drinks

If you note (d), it contains 3 times the amount of each item used in (c) .: the cost must be 3 times too!

.: 26x3 = $78 🎉 ☮

As a side side-note you also know that since 6 popcorns and 8 drinks cost $62 then 6 popcorns and 12 drinks must be greater than $62 (by 4 drinks worth). It's interesting how much we can sometimes determine from so little!

– Greg / GregsTutoringNYC@gmail.com LLAP ☮