



IIT Madras

ONLINE DEGREE

Mathematics for Data Science 1

Week-03

Tutorial-03

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Two friends Lincoln and Lila purchase shares of two companies. Lincoln purchases six shares of company M and one share of company N spending Rs. 400 overall. Lila purchases four shares of company M and three shares of company N spending Rs. 360 overall. How much did each of them spend on company N?

$$\begin{aligned}
 6P_m + P_n &= 400 \\
 4P_m + 3P_n &= 360
 \end{aligned}$$

$$\begin{aligned}
 24P_m + 4P_n &= 1600 \\
 24P_m + 18P_n &= 2160 \\
 \hline
 -14P_n &= -560 \\
 P_n &= \frac{560}{14} = 40
 \end{aligned}$$

$P_n = ₹40$
 Lincoln spent ₹40.
 Lila spent ₹120.

Now, third question, you have two friends Lincoln and Lila who purchase shares of two companies. Lincoln purchases six shares of a company M and one share of company N and overall spends 400. This can be encapsulated as if the company M's share price is P_m and for n that is P_n we can say that $6P_m + P_n = 400$. Then for Lila there is four shares of Company M and three shares of Company N coming to 360.

So, for Lila we have $4P_m + 3P_n = 360$. How much did each of them spend on n? So, we need to know what is P_n and $3P_n$, that is what we are interested in. To find the values of P_m and P_n we will require to solve these two linear equations. However, we only required to find P_n because the question is only pertaining to the company N's shares. So, we can work towards eliminating the P_m variable from these two equations.

So, we can multiply this equation by 4 and this one by 6 because $4 \times 6 = 24$, $6 \times 4 = 24$ and that way we should be able to subtract $24P_m$. So, we are going to get from the first equation $24P_m + 4P_n = 1600$, whereas, from the second equation we get $24P_m + 18P_n = 2160$. Now, if we subtract second equation from the first we get these two canceling off and here we get $-14P_n = 560$.

And this indicates that $P_n = 560/14$ because we can cancel out the plus and the plus and that is equal to 40. So, P_n is 40 rupees per share. And now since Lincoln has purchased only one share, Lincoln spent only 40 rupees on company N, whereas, Lila spent three times that which is rupees 120.

