

Applications of Linear Systems

For each question, set up your equations by carefully reading the text of the question. Then check whether your “set up” for the question is correct using the “partial solutions” provided.

After that, solve the linear system you came up with. Verify whether your algebra is correct using a left-side/right-side check. Only when needed, consult the “full solutions” provided.

1. At a sale in a retro music store, all CDs are one price and all tapes are another price. Three CDs and two tapes cost \$72. One CD and three tapes cost \$52. What are the prices of one CD and one tape?
2. A sports club charges an initiation fee and a monthly fee. At the end of 5 months, a member had paid a total of \$170. At the end of 10 months, she had paid a total of \$295. What was the initiation fee?
3. A tennis club charges an annual fee and an hourly fee for court time. One year, one member played for 39 hours and paid \$384. Another member played for 51 hours and paid \$456. Determine the annual fee and the hourly fee.
4. Three footballs and one soccer ball cost \$155. Two footballs and three soccer balls cost \$220. Determine the cost of one football and the cost of one soccer ball.
5. For the school play, one adult ticket cost \$5.00 and one student ticket cost \$3.00. Twice as many student tickets as adult tickets were sold. The total receipts were \$1650. How many of each kind of ticket were sold?
6. An American football stadium has 20 000 seats between the goal lines and 5000 in the end zones. An end-zone seat is \$5 cheaper than one between the goal lines. For one game, the revenue was \$350 000 when all seats were sold. What is the cost of each type of seat?
7. When 20 bolts are placed in a box, the total mass is 340 g. When there are 48 bolts in the box, the total mass is 760 g. Determine the mass of the box and the mass of each bolt.
8. A crate of 36 grapefruit has a total mass of 4 kg. When 12 grapefruit are removed, the total mass is 3 kg. Determine the mass of the crate and the mass of one grapefruit.

Applications of Linear Systems — Final Answers

Final answers only. The partial solutions (the “set up”) and the full solutions provide more details.

1. One CD costs \$16 and one tape costs \$12.
2. The initiation fee is \$45. (The monthly fee is \$25.)
3. The annual fee is \$150 and the hourly fee is \$6.
4. One football costs \$35 and one soccer ball costs \$50.
5. 150 adult tickets and 300 student tickets were sold.
6. A seat between the goal lines costs \$15 and an end-zone seat costs \$10.
7. The box has a mass of 40 g and each bolt has a mass of 15 g.
8. The crate has a mass of 1 kg and one grapefruit has a mass of $\frac{1}{12}$ kg, or about 0.083 kg (83 g).