

## Systems of Linear Equations

1. The sum of two numbers is 17, and their difference is 21. Find the two numbers.
2. The sum of two numbers is 35, and their difference is 27. Find the two numbers.
3. A total of 1,096 people attended the Beach Boys concert. Reserved seats cost \$25 each and general admission seats cost \$20 each. If \$26,170 was collected, how many of each type of seat were sold?
4. There were 311 tickets sold for a soccer game, some for students and some for non-students. Student tickets cost 25¢ each and non-student tickets cost 75¢ each. The total receipts were \$108.75. How many of each type of ticket were sold?
5. Adam wishes to mix 30 lb of candy worth \$6 per lb with candy worth \$3 per lb to get a mixture worth \$5 per lb. How much of the \$3 candy should be used?
6. A popular fruit drink is made by mixing fruit juice and soda. Such a mixture with 50% juice is to be mixed with another mixture that is 30% juice to get 100 liters of a mixture which is 45% juice. How much of each should be used?
7. A freight train and an express train leave towns 390 km apart, traveling toward one another. The express train travels 30 km/hr faster than the freight train. They pass one another 3 hrs later. What are their speeds?
8. Two cars start out from the same spot and travel in opposite directions. At the end of 6 hrs, they are 690 km apart. If one car travels 15 km/hr faster than the other, what are their speeds?
9. A train travels 150 km in the same time that a plane covers 400 km. If the speed of the plane is 20 km/hr less than 3 times the speed of the train, find both speeds.
10. In his motorboat, Tom travels upstream at top speed to his favorite fishing spot, a distance of 18 mi, in 1 hr. Returning, he finds that the trip downstream, still at top speed, takes only  $\frac{3}{4}$  hr. What is the speed of the current? What is the speed of Tom's boat in still water?
11. A chemist needs 10 liters of a 24% alcohol solution. She has on hand a 30% alcohol solution and an 18% alcohol solution. How many liters of each should be mixed to get the required solution?
12. A supplier of poultry sells 20 turkeys and 8 chickens for \$74. He also sells 15 turkeys and 24 chickens for \$87. Find the cost of a turkey and the cost of a chicken.
13. Ray is a building contractor. If he hires 8 brick layers and 2 roofers, his daily payroll is \$960, while 10 brick layers and 5 roofers require a daily payroll of \$1,500. Find the daily wage of a brick layer and the daily wage of a roofer.
14. During summer vacation Hector and Ann earned a total of \$6,496. Hector worked 8 days less than Ann and earned \$4 per day less. Find the number of days he worked and the daily wage made, if the total number of days worked by both was 72.
15. A bank teller has ten-dollar bills and twenty-dollar bills. He has 25 more twenties than tens. The value of the bills is \$2,900. How many of each kind does he have?
16. George plans to invest \$30,000 he won in a lottery. With part of the money he buys a mutual fund, paying 4.5% a year. The rest he invests in utility bonds paying 5% per year. The first year his investments bring a return of \$1,410. How much is invested at each rate?
17. How much milk that is 3% butterfat should be mixed with milk that is 18% butterfat to get 25 gal of milk that is 4.8% butterfat?
18. Sweet's Candy Store is offering a special mix for Valentines's Day. Ms. Sweet will mix some \$2 per pound candy with some \$1 per pound candy to get 50 pounds of mix that she will sell at \$1.30 per pound. How many pounds of each should be used?
19. To start a new business, Mark borrowed money from two financial institutions. One loan was at 7% interest and the other was for one-third as much money at 8% interest. How much did he borrow at each rate if the total amount of annual interest was \$1,160?
20. Susan has invested a total of \$20,000 in two ways. Part of the money is in certificates of deposit paying 3.75% interest, while the rest is in municipal bonds that pay 8.2% interest. How much is there in each account if the total annual interest is \$1,417.50?
21. A botanist has patented a successful type of plant food that contains two chemicals, X and Y. Eight hundred kg of these chemicals will be used to make a batch of the food, and the ratio of X to Y must be 3 to 2. How much of each chemical should be used?
22. A manufacturer of portable CD players shipped 200 of the players to its two Quebec warehouses. It cost \$3 per unit to ship to Warehouse A, and \$2.50 per unit to ship to Warehouse B. If the total shipping cost was \$537.50, how many were shipped to each warehouse?
23. Octane ratings show the percent of isooctane in gasoline. An octane rating of 98, for example, indicates a gasoline that is 98% isooctane. Find the number of gal of 98-octane gasoline and 92-octane gasoline that must be mixed to produce 40 gal of 94-octane gasoline.
24. A truck radiator holds 24 liters of fluid. How much pure antifreeze must be added to a mixture that is 4% antifreeze in order to fill the radiator with a mixture that is 20% antifreeze?
25. On a 10-day trip Ed rented a car for \$31 a day at weekend rates and \$40 a day at weekday rates. If his rental bill was \$364, how many days did he rent at each rate?
26. In an election, one candidate received 135 more votes than the other. The total number of votes cast in election was 1,215. Find the number of votes received by each candidate.

## Selected Answers

- 1** 19 and -2
- 3** 850 reserved; 246 general admission
- 5** 15 lb
- 7** freight: 50 km/hr; express: 80 km/hr
- 9** plane: 160 km/hr; train 60 km/hr
- 11** 5 l of 30%; 5 l of 18%
- 13** \$90 for a brick layer; \$120 for a roofer
- 15** 80 tens; 105 twenties
- 17** 22 gal of 3%; 3 gal of 18%
- 19** \$12,000 at 7%; \$4,000 at 8%
- 21** 480 kg of X; 320 kg of Y
- 23** 13  $\frac{1}{3}$  gal of 98 octane; 26  $\frac{2}{3}$  gal of 92 octane
- 25** 4 days at weekend rate; 6 days at weekday rate