Systems of Equations – Problem Solving

For each of the following problems:
1. define each variable
2. translate the related facts into two equations

Number Problems

1. The sum of two numbers is 45 and their difference is 7. Find the numbers.
2. The sum of two numbers is –33 and their difference is –1. Find the numbers.
3. The difference between two numbers is 12 and their sum is 24. Find the numbers.
4. The difference between two numbers is –20 and their sum is 36. Find the numbers.
5. The sum of two numbers is 22. Five times one number is equal to six times the second number. Find the numbers.
6. The sum of two numbers is 40. Three times one number is equal to four times the second number. Find the numbers.
7. The difference between two numbers is 12. Four times one number is equal to three times the second number. Find the numbers.
8. The difference between two numbers is 8. Two times one number is equal to three times the second number. Find the numbers.
9. One number is 4 more than a second.number. The sum of the two numbers is 22. Find the numbers.
10. One number is 4 less than a second.number. The sum of the two numbers is 30. Find the numbers.
11. One number is 2 more than three times a second.number. The sum of the two numbers is 30. Find the numbers.
12. One number is 5 less than four times a second.number. The sum of the two numbers is 26. Find the numbers.
13. One number is 10 more than five times a second.number. The difference of the two numbers is 8. Find the numbers.
14. One number is 8 less than three times a second.number. The difference of the two numbers is 14. Find the numbers.
15. Three times one number is 8 more than 2 times the second number. The sum of the two numbers is 40. Find the numbers.
16. Four times one number is 6 less than five times the second number. The sum of the two numbers is 55. Find the numbers.
17. Five times one number is 12 more than three times the second number. The difference of the two numbers is 13. Find the numbers.
18. Six times one number is 5 less than three times the second number. The difference of the two numbers is -8. Find the numbers.
19. One number is 6 more than the second number. Three times the first number plus twice the second number is equal to 36. Find the numbers.
20. One number is 9 less than the second number. Three times the second number plus four times the first number is equal to 48. Find the numbers.
21. One number is 14 more than the second number. Four times the first number minus twice the second number is equal to 6. Find the numbers.
22. One number is 16 less than the second number. Five times the second number minus three the first number is equal to 14. Find the numbers.

23. The sum of four times the first number and 2 times the second is 58. Three times the first number added to the second number is 34. Find the numbers.
24. The difference of four times the first number and 3 times the second is 6. Three times the first number subtracted from 2 times the second number is 12. Find the numbers.
25. One number is 6 more than the second. Five more than the second number is the same as the first number less 3. Find the numbers.
26. One number is 3 more than three times the second. Four more than twice the second number is the same as the first number increased by 8. Find the numbers.

Angle Problems

1. One complementary angle is 10 degrees more than the second. Find the two angles.
2. One complementary angle is 8 degrees less than the second. Find the two angles.
3. Three times one complementary angle is 8 degrees more than the second. Find the angles.
4. Two times one complementary angle is 4 degrees less than the second. Find the angles.
5. Four times one complementary angle decreased by three times the second is 8 degrees. Find the angles.
6. Five times one complementary angle increased by two times the second is 340 degrees. Find the angles.
7. One supplementary angle is 20 degrees more than the second. Find the two angles.
8. One supplementary angle is 16 degrees less than the second. Find the two angles.
9. Five times one supplementary angle is 4 degrees more than the second. Find the angles.
10. Three times one supplementary angle is 15 degrees less than the second. Find the angles.
11. Four times one supplementary angle decreased by two times the second is 24 degrees. Find the angles.
12. Six times one supplementary angle increased by three times the second is 840 degrees. Find the angles.
13. The difference between 2 times one complementary angle and the second is 90 degrees. Find the angles.
14. The difference between 4 times one supplementary angle and twice the second is 360 degrees. Find the angles.
15. If one of two complementary angles measures 30 degrees less than twice the other angle, what is the measure of each of the angles?
16. If one of two supplementary angles measures 16 degrees more than three times the other, what is the measure of each of the angles?

Money Problems

1. There are five times as many $2 bills as $5 bills. The total number of bills is 48. How many $2 bills are there?
2. Maria has 41 coins. She has 3 more nickels then pennies. How many nickels and how many pennies has she?
3. Mike has $1.55 in nickels and dimes. He has 7 more nickels than dimes. Find the number of each kind of coin.
4. James has $1.25 in nickels and dimes. He has three times as many nickels as dimes. Find the number of each kind of coin.

5. Ester has 16 coins, some quarters and the rest nickels. The total value of all the coins is $1.40. Find the number of each kind of coin.
6. Stewart has 25 stamps; some 15 cents and the rest 18 cents. The value of all the stamps is $4.05. How many stamps of each kind does he have?
7. There were 3000 people at a football game. Some paid $10 for their tickets while the rest paid $5. The total receipts amounted to $25,000. How many tickets of each kind were sold?
8. A total of 10,000 people attended a concert with gate receipts of $175,000. Adults tickets cost $20 and student tickets cost $15. How many adults attended the concert?
9. A total of $290 was spent on the purchase of CDs and DVDs. If 7 CDs and 5 DVDs were purchased and DVDs cost $10 more than CDs, how much was spend on each DVD?
10. Walnuts cost 60 cents more a pound than peanuts. If Mr. Carroll paid $15.60 for 4 pounds of peanuts and 6 pounds of walnuts, what did he pay for a pound of each?
11. A farmer sent 500 bags of potatoes to a commission merchant; some at $9 a bag and the rest at $5 a bag. If he received $3940 in payment, how many bags of each did he send?
12. Seats in the reserved section at the school play cost $6.50 each and in the regular section $4 each. How many tickets of each kind were sold if the total receipts for 980 tickets amounted to $6,540?

Geometry Problems

1. The length of a rectangle is 4 meters more than the width. The perimeter of the rectangle is 40 meters. What do the length and the width each measure?
2. The length of a rectangle is 14 meters more than the width. The perimeter of the rectangle is 264 meters. What do the length and the width each measure.
3. The perimeter of a rectangle is 168 meters. Its length is five times its width. Find the length and the width.
4. The width of a rectangle is 5 meters less than the length. Find the dimensions of the rectangle if its perimeter is 90 meters.
5. The length of a rectangle is 8 centimeters more than six times its width. The perimeter of the rectangle is 156 centimeters. What do the length and the width each measure?
6. The base of an isosceles triangle is 7 meters longer than each of the other equal sides. What does each side of the triangle measure if the perimeter is 58 meters?
7. In a right triangle the measure of one acute angle is 6 more than twice the other acute angle. What is the measure of each angle?
8. The difference between the length and width of a rectangle is 7 centimeters. The perimeter of the rectangle is 50 centimeters. Find the length and width.

Investment Problems

1. A woman invested $4,000; part at 5% and the rest at 9% per year. If she receives $260 income for the year from these investments, how much did she invest at each rate?

2. Mr. Adams invested a part of his savings at 8% and the rest at 6% per year. If he receives an annual income of $240 from a total investment of $3,400. How much did he invest at 8%?
3. A 7% investment brings an annual return of $36 more than a 9% investment. The total amount invested is $1,200. Find the amount invested at each rate.
4. A man invested a certain amount of money at 8% per year and $2,00 more than that amount at 10% per year. If the total annual income is $524, how much did he invest at 10%?
5. Mr. Jones invested $500 more at 7% per year than he did at 12% per year. If the annual income he receives from the 12% investment is $90 more than the income from the 7% investment, how much did he invest at each rate?
6. A man invested $1,800; part at 4% and the rest at 6% per year. If he receives an annual income of $84 from these investments, how much did he invest at each rate?

Age Problems

1. A man is twice as old as his son. Together the sum of their ages is 63 years. What are their ages?
2. Ed is 5 years older than Jim. Four times Jim's age increased by 3 years equals three times Ed's age diminished by 2 years. Find Ed's age.
3. The difference in ages of 2 girls is 1 year. The sum of their ages is 27 years. What are their ages?
4. Mr. Whitney is three times as old as his son. Twelve years from now he will only be twice as old. What are their ages now?
5. Richard is twice as old as his brother. Four years ago he was four times as old. What are their ages now?
6. Arthur is 12 years younger then Robert. Three years ago Robert was five times as old as Arthur. How old is Robert now?
7. Lucy is 5 years older than Dorothy. Four years ago eight times Dorothy's age equaled three times Lucy's age. What is Lucy's age now?
8. The sum of the ages of a mother and daughter is 45 years. Five years ago the mother was six times the daughter's age. What are their ages now?
9. The sum of the ages of a father and son is 46 years. In 2 years four times the son's age will equal the father's age. Find their present age.
10. Eight years ago Jim was three times as old as Tom. However, eight years from now Jim will only be twice as old as Tom. What are their present ages?

Mixture Problems

1. A grocer mixes cookies worth 80 cents a kg with cookies worth 95 cents a kg making a mixture selling at 85 cents a kg. If he mixes 60 kilograms, how many kilograms of each kind does he use?
2. A confectioner wishes to make 80 kilograms of mixed candy to sell at 90 cents a kg. If he mixes candy worth 79 cents a pound with candy worth a $1.21 a kg, how many kilograms of each kind does he use?

3. How many kilograms of tea worth $4.95 a kg should be blended with tea worth $3.87 a kg to make 40kgs of blended tea to sell at $4.35 a kg?
4. The cooling system in Ann's car contains 19 liters of 30% antifreeze. How much coolant must be drained out and replaced with 80% antifreeze so that the system will contain 50% antifreeze. How much of the original coolant will be left in the car?
5. A certain alloy contains 8% silver. Another alloy contains 165 silver. How many kilograms of each alloy must be mixed to make 10 kg of an alloy that is 125 silver?