

# LINEAR EQUATIONS WORD PROBLEMS WORKSHEET WITH SOLUTIONS

1. A delivery service charges a base fee of \$5 plus \$2.50 for each package delivered. If the total cost for delivering a certain number of packages is \$25, determine how many packages were delivered.

2. A youth club is organizing a camping trip. The initial number of boys signed up is 40, and each week, 2 more boys join the trip. How long will it take for there to be 100 boys signed up?

3. The sum of Maria's age and twice her sister's age is 36. Write a linear equation to represent this relationship and determine Maria's age if her sister is 8 years old.

4. A taxi service charges a fixed fee of \$8 plus \$1.75 for each mile traveled. If the total cost for a taxi ride is \$25, determine the number of miles traveled.

5. The sum of two numbers is 15. Twice the first number added to three times the second number is 36. Write a system of linear equations to represent this information and find the values of the two numbers.

6. Jane is organizing a fundraiser. The total number of adults and children attending is 80. The entrance fee for adults is \$10, and for children, it is \$5. The total amount collected is \$600. Write a system of linear equations to represent this information and find the number of adults and children.

7. Alice has \$50 and decides to save \$5 each week. Bob has no savings initially but saves \$8 each week. After how many weeks will Alice and Bob have the same amount of money saved?

8. The present ages of two friends are such that the sum of their ages is 50. Six years ago, one friend's age was twice the age of the other. Determine their present ages.

# ANSWERS

1. A delivery service charges a base fee of \$5 plus \$2.50 for each package delivered. If the total cost for delivering a certain number of packages is \$25, determine how many packages were delivered.

Let  $P$  represent the number of packages delivered.

Let  $C$  represent the total cost in dollars

$$C = 5 + 2.5P$$

$$25 = 5 + 2.5P$$

$$20 = 2.5P$$

$$8 = P \quad \text{Therefore 8 packages were delivered.}$$

2. A youth club is organizing a camping trip. The initial number of boys signed up is 40, and each week, 2 more boys join the trip. How long will it take for there to be 100 boys signed up?

Let  $B$  represent the total number of boys

Let  $w$  represent the number of weeks

$$B = 40 + 2w$$

$$100 = 40 + 2w$$

$$60 = 2w$$

$$30 = w \quad \text{Therefore it will take 30 weeks for 100 boys to sign up.}$$

3. The sum of Maria's age and twice her sister's age is 36. Write a linear equation to represent this relationship and determine Maria's age if her sister is 8 years old.

Let  $M$  represent Maria's age

Let  $S$  represent her sister's age

$$M + 2S = 36$$

$$M + 2(8) = 36$$

$$M = 20 \quad \text{Therefore Maria is 20 when her sister is 8.}$$

4. A taxi service charges a fixed fee of \$8 plus \$1.75 for each mile traveled. If the total cost for a taxi ride is \$25, determine the number of miles traveled.

Let  $D$  represent the number of miles traveled

Let  $C$  represent the total cost in dollars

$$C = 8 + 1.75D$$

$$25 = 8 + 1.75D$$

$$17 = 1.75D$$

$$9.714 = D \quad \text{Therefore the taxi traveled 9.714 miles when the cost is $25.}$$

5. The sum of two numbers is 15. Twice the first number added to three times the second number is 36. Write a system of linear equations to represent this information and find the values of the two numbers.

Let  $x$  represent the first number  
Let  $y$  represent the second number

$$\begin{array}{rcl} x + y = 15 & \text{substitute back into the original equation} & x + 6 = 15 \\ \underline{2x + 3y = 36} & & x = 9 \\ \text{multiply equation 1 by 2} & & \\ 2x + 2y = 30 & & \\ \text{subtract} & & \underline{2x + 3y = 36} \\ & & -y = -6 \\ & & y = 6 \end{array}$$

Therefore the two numbers are 9 and 6.

Note: we can also solve this system using substitution instead by writing the first equation as  $x = 15 - y$  and substituting it into the second equation.

6. Jane is organizing a fundraiser. The total number of adults and children attending is 80. The entrance fee for adults is \$10, and for children, it is \$5. The total amount collected is \$600. Write a system of linear equations to represent this information and find the number of adults and children.

Let  $A$  represent the number of adults  
Let  $C$  represent the number of children

$$\begin{array}{l} A + C = 80 \longrightarrow A = 80 - C \\ 10A + 5C = 600 \quad \text{rearrange the first equation} \end{array}$$

$$\begin{array}{l} 10A + 5C = 600 \\ 10(80 - C) + 5C = 600 \quad \text{substitute it into the second} \\ 800 - 10C + 5C = 600 \\ -5C = -200 \\ C = 40 \end{array}$$

substitute  $C=40$  into either equation

$$\begin{array}{l} 10A + 5(40) = 600 \\ 10A = 400 \\ A = 40 \end{array}$$

Note: we can also solve this system using elimination instead using a similar process to the previous problem.

Therefore 40 adults and 40 children attended.

7. Alice has \$50 and decides to save \$5 each week. Bob has no savings initially but saves \$8 each week. After how many weeks will Alice and Bob have the same amount of money saved?

Let  $A$  represent the amount of money Alice has saved  
Let  $B$  represent the amount of money Bob has saved  
Let  $w$  represent the number of weeks

$$\begin{array}{l} A = 50 + 5w \\ B = 8w \end{array}$$

$$\begin{array}{l} 50 + 5w = 8w \quad \text{setting the equations equal to one another} \\ 50 = 3w \\ 16.67 = w \end{array}$$

Therefore, after approximately 17 weeks Alice and Bob will have saved the same amount of money.

8. The present ages of two friends are such that the sum of their ages is 50. Six years ago, one friend's age was twice the age of the other. Determine their present ages.

Let  $A$  represent the age of one friend  
Let  $B$  represent the age of the other

$$\begin{array}{l} A + B = 50 \longrightarrow A = 50 - B \\ A - 6 = 2(B - 6) \quad \text{rearrange the first equation} \end{array}$$

$$\begin{array}{l} \text{substitute it into the second} \\ 50 - B - 6 = 2(B - 6) \\ 44 - B = 2B - 12 \\ 56 = 3B \\ 18.67 = B \end{array}$$

substitute  $B=18.67$  into either equation

$$\begin{array}{l} A + 18.67 = 50 \\ A = 31.33 \end{array}$$

Therefore one friend is approximately 19 and the other is approximately 31.



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