**Linear Equations as Word Problems Answer Key**

**Steps**

1. **What am I asked to find to solve the problem. Write a “Let x =”statement**
2. **What information am I given? What do the numbers represent.**
3. **What math operations should I use?**
4. **What is the equation equal to?**
5. **Write the equation and solve.**
6. **Write a closing sentence.**

Examples: Convert the following statements into equations
(a) 5 added to a number is 9.

Let *X*= the number Verify x=4

X +5 =9 4+5=9√

X + 5 +(-5)=9+(-5)
 x= 4
The number is 4.

(b) 5 times a number decreased by 2 is 4.
Let *X*= the number Verify x=4

5X -2 =4 4+5=9√

5X +(-2) +2=4 +2
 5x= 6

5x/5= 6/5

 X = 1 1/5 or 1.2
The number is 4.

(c) 2 times the sum of the number x and 7 is 13.

(d) The sum of two consecutive even numbers is 38. Find the numbers.

**Your Turn
1.**A number is 12 more than the other. Find the numbers if their sum is 48.

 Let *X*= the first number Verify x=18

X + 12 = the second number 2(18) +12 =48

X + x+12 = 48 36+12=48

2x +12 =(-12)= 48 +(-12) 48 =48 √

 2x = 36

 2x/2 = 36/2

 **X= 18 x+12= 18+12 =30 18+30 +48**

 **The first number is 18 and the second number is 30**

**2.**Twice the number decreased by 22 is 48. Find the number.

Let *X*= the first number Verify x=35

2x -22 = 48 2(35) +(-22) =48

2x +(-22)+22 = 48 +22 70 +(-22) =48

2x = 70 48 =48 √

 2x/2 = 70/2

 **X = 35**

**The number is 35.**
**3.**Seven times the number is 36 less than 10 times the number. Find the number.

Let *X*= the number Verify x=-12

7x -36 = 10x 7(-12) +(-36) =10 (-12)

7x +(-36)+36 = 10x +36 -84 +(-36) =-120

7x = 10x +36 -120 =-120 √

7x+(-10x) =10x+(-10x)+36

 -3x = 36

 -3x/-3 = 36/-3

 **X = -12**

**The number is -12.**

**4.**The sum of three consecutive odd numbers is 51. Find the numbers.

Let *X*= the smallest number Verify x= 15

 X +2 = next odd number x + 2= 15+2= 17

 X +4 = largest odd number x +4 = 15+4= 19

(Sum) x + x+2 +x+4 = 51 15 +17+19 =51

(Like Terms) 3x +6 =51 32+19 = 51

 3x +6 +(-6)=51+(-6) 51=51 √

 3x = 45

 3x/3 = 45/3

 X = 15

 **The numbers are 15, 17 and 19.**

**5.**The length of a rectangle is 10 m more than its width. If the perimeter of rectangle is 80 m, find the dimensions of the rectangle.

Let w = the width w+10 (Perimeter is distance around the rectangle.)

W+10 = the length w w

 W+10

 W + W + w+10 +w+10 = 80 OR 2(w + w=10)= 80 Verify W=15

 4w +20 = 80 4(15) +20=80

 4w +20 +(-20)= 80 +(-20) 60 +20 =80

 4W = 60 80=80 √

 4W/4 = 60/4

 **W = 15 w+10 = 15+10=25**

 **The rectangle has a width of 15 m and a length of 25 m.**

**6.**A 300 m long wire is used to fence a rectangular plot whose length is twice its width. Find the length and width of the plot.

Let w = the width 2w (Perimeter is distance around the rectangle.)

2W = the length w w

 2W

 W + W + 2w +2w = 300 OR 2(w + 2w )= 300 Verify W=50

 6w = 300 6(50)=300

 6w/6 = 300/6 300=300 √

 **(Width)**  **W= 50**

 **(Length) 2w = 2(50)=100**
 **The rectangle has a width of 50 m and a length of 100 m.**

**7.**Adman’s father is 49 years old. He is 5 years older than four times Adman’s age. What is Adman’s age?

 Let x = Adman’s age and 4x +5 = Adman’s father’s age Verify x =11

4x + 5 = 49 4(11)+5 = 49

4x +5 +(-5)=49+(-5) 44+5 =49

 4x = 44 49=49√

 4x/4= 44/4

 **X= 11
 Adman is 11 years old**.

**8.**The cost of a pencil is 25 cents more than the cost of an eraser. If the cost of 8 pencils and 10 erasers is $12.80, find the cost of each.

Let e = the cost of the eraser and e +0.25 = cost of the pencil

8 pencils cost = 8(e+0.25) 10 erasers cost =10 e

 Verify
8(e+0.25)+ 10e = $12.80 8($0.60+0.25)+ 10($0.60)= $12.80

8e + $2.00 + 10e = $12.80 $4.80+$2.00 + $6.00 =$12.80

18e + $2.00 = $12.80 $6.80 + $6.00=$12.80

18e + $2.00 +(-$2.00) = $12.80+(-$2.00) $12.80=$12.80√

18e = $10.80

18e/18 = $10.80/18

 **e=$0.60 (eraser)**

**e+$0.25=$0.60+$0.25=$0.85 (pencil)**

**The cost of an eraser is $0.60 and a pencil is $0.85.**