

## HOW TO SOLVE WORD PROBLEMS







The hardest thing about doing word problems is taking the English words and translating them into mathematics. Usually, once you get the math equation, you're fine; the actual math involved is often fairly simple.

- Step 1:** Read the problem 2 or 3 times to get a general idea.  
**Step 2:** Identify the known and unknown highlighting/ underlining.  
**Step 3:** Write a let statement for each of the unknowns.  
**Step 4:** Translate English sentences into mathematical expressions and equations.  
**Step 5:** Solve.  
**Step 6:** Check.  
**Step 7:** State your answer in a short sentence.

\*\*PUT FORMAL MATH ON THE LEFT

\*\*SKETCH, NOTES, GRAPHS ON THE RIGHT

With a partner, brainstorm as many words you possibly can for each operation.

<p><b>DIVISION</b></p>  <p><b>Divide, Quotient</b>  <b>Goes into, Split equally</b>  <b>Per, Out of, Ratio of</b>  <b>Percent (divide by 100)</b></p>	<p><b>MULTIPLICATION</b></p>  <p><b>Multiply, times</b>  <b>of</b>  <b>multiplied by</b>  <b>Product of</b></p>
<p><b>ADDITION</b></p>  <p><b>Add, Sum, plus, Total of</b>  <b>Combined together</b>  <b>Increased by, More than</b></p>	<p><b>SUBTRACTION</b></p>  <p><b>Decreased by, minus, less</b>  <b>Difference between/of</b>  <b>Less than, Fewer than</b>  <b>Subtract, Remain</b></p>
<p><b>EQUALS</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">    </div> <div style="text-align: center;"> <p><b>is, are, was, were, will be, gives, yields, sold for</b></p> </div> </div>	

**Type 1: Number Problems:**

1. Three footballs and one soccer ball cost \$155. Two footballs and three soccer balls cost \$220. Find the cost of a football and the cost of a soccer ball.

Plan let "f" be the cost of 1 football  
let "s" " " " " " " 1 soccer ball

$$\begin{aligned} \text{Action 1} \quad & 3f + s = 155 \quad \text{①} \\ & 2f + 3s = 220 \quad \text{②} \\ & \underline{9f + 3s = 465} \\ & \underline{-2f + 3s = 220} \\ & 7f = 245 \\ & \underline{7} \\ & f = 35 \end{aligned}$$

Action 2

$$\begin{aligned} 3f + s &= 155 \\ 3(35) + s &= 155 \\ 105 + s &= 155 \\ \underline{-105} & \quad \underline{-105} \\ s &= 50 \end{aligned}$$

Conclusion  
∴ 1 football costs \$35  
and 1 soccerball costs \$50

CHECK  $f=35$   $s=50$

$2f + 3s$	$220$
$2(35) + 3(50)$	
$= 70 + 150$	
$= 220$	
$1S = 1S$	

∴ The solution is  $f=35$  and  $s=50$

2. A tennis club charges an annual fee and an hourly fee for court time. One year, Tony played for 39 hours and paid \$384, while Sandra played for 51 hours and paid \$456. Find the annual fee and the hourly fee

Plan let "a" be the annual fee  
let "h" be the hourly fee

$$\begin{aligned} 39h + a &= 384 \\ 51h + a &= 456 \end{aligned}$$

Action 1

$$\begin{aligned} 39h + a &= 384 \\ \underline{51h + a} &= \underline{456} \\ -12h &= -72 \\ \underline{-12} & \quad \underline{-12} \\ h &= 6 \end{aligned}$$

Action 2

$$\begin{aligned} 39h + a &= 384 \\ 39(6) + a &= 384 \\ 234 + a &= 384 \\ \underline{-234} & \quad \underline{-234} \\ a &= 150 \end{aligned}$$

Conclusion  
∴ The annual fee is \$150 and the hourly fee is \$6.

CHECK  $a=150$   $h=6$

$51h + a$	$456$
$51(6) + 150$	
$= 306 + 150$	
$= 456$	
$1S = 1S$	

∴  $a=150$   
 $h=6$

**Type 2: Interest Problems**

Chloe has \$12000 to invest. She invested part of it in bonds paying 8% per year and the remainder in a second mortgage paying 9% per year. After one year the total interest from these investments was \$1043. How much did Chloe invest at each rate?

let "e" be the \$ invested in 8%  
let "n" be the \$ invested in 9%

$$\begin{aligned} \text{①} \quad e + n &= 12000 \\ \text{②} \quad 0.08e + 0.09n &= 1043 \end{aligned}$$

multiply it by 0.08

Action 1

$$\begin{aligned} 0.08e + 0.08n &= 960 \\ \underline{0.08e + 0.09n} &= \underline{1043} \\ -0.01n &= -83 \\ \underline{-0.01} & \quad \underline{-0.01} \\ n &= 8300 \end{aligned}$$

Action 2

$$\begin{aligned} e + n &= 12000 \\ e &= 12000 - n \\ &= 12000 - 8300 \\ e &= 3700 \end{aligned}$$

∴ Chloe invested \$3700 @ 8% and \$8300 @ 9%.