Example 1- Money problem
Deena has $265 in $5 bills and $20 bills. She has 26 total bills. How many of each type of bill does she have?

Step 1- What are the two things we need to find?
        The two things we need to find are the number of $5 bills and the number of $20 bills.

Step 2- Assign variables to these two things.
        F - # of $5 bills T - # of $20 bills

Step 3- Make two equations
        For money problems, you usually have one equation that deals with the total amount of cash and another equation that deals with the total number of bills (or coins)
$$5F + 20T = 265$$ (this deals with total cash)
$$F + T = 26$$ (this deals with the total number of bills)

Step 4- Solve!
        You can use substitution or linear combination/dropout – it doesn't matter! Let's use linear combination/dropout on this example.

$$5F + 20T = 265$$
$$-5(F + T = 26)$$

$5F + 20T = 265$ If $T = 9$, then $F + 9 = 26$
$-5F - 5T = -130$ $F = 17$
$\quad 15T = 135$
$\quad\quad T = 9$

Step 5- Clearly label answers
        Don't just write that $T = 9$ and $F = 17$. Let's write

9 $20 bills
17 $5 bills

Example 2- Wind and plane speed

Snoopy is going to fly his plane 480 miles from his doghouse to Woodstock's cousin's bird nest. He travels east into a headwind in 3 hours and returns west with the same wind as a tailwind in 2 hours. Find the speed of the wind and the speed of Snoopy's plane.

Step 1- What are the two things we need to find?

      The two things we need to find are the the speed of the wind and the speed of Snoopy's plane.

Step 2- Assign variables to these two things.

      P – speed of Snoopy's plane W – speed of wind

Step 3- Make two equations

      Remember that rate * time = distance. We can put this much information together right now:

	Rate	Time	Distance
East		3	480
West		2	480

      If you have the wind to your back when you are running (or flying a plane), this tailwind will make you faster (your speed + wind speed). If you are running into the wind, the headwind will slow you down (your speed – wind speed). That's how we'll fill in the rates of Snoopy's plane:

	Rate	Time	Distance
East	$(P - W)$	3	480
West	$(P + W)$	2	480

      We can use the distributive property to make our equations:

$$(P - W)(3) = 480 \longrightarrow 3P - 3W = 480$$
$$(P + W)(2) = 480 \longrightarrow 2P + 2W = 480$$

Step 4- Solve!

   You can use substitution or linear combination/dropout – it doesn't matter! Let's use linear combination/dropout on this example.

$$3P - 3W = 480$$
$$2P + 2W = 480$$

$$2(3P - 3W = 480)$$
$$3(2P + 2W = 480)$$

$6P - 6W = 960$ If $P = 200$, then $2(200) + 2W = 480$
$\underline{6P + 6W = 1440}$ $400 + 2W = 480$
$\quad 12P = 2400$ $2W = 80$
$\quad\quad P = 200$ $W = 40$

Step 5- Clearly label answers

   Don't just write that $P = 200$ and $W = 40$. Let's write

Snoopy's plane speed   200 mph
Wind speed   40 mph