Story problems are my friends NAME:

We will practice solving story problems. The rough steps are outlined for each problem. Remember, always create a verbal model before you try to form an equation. It's also very important to define your variable specifically and to write your definition down. Usually, we're able to make the variable represent what we are being asked to find. (Some people may be able to figure these problems out with no algebra. But keep in mind the reason we are doing this is to learn algebra.)

1. Araceli worked 48 hours at her job last week. She is paid time-and-a-half for work in excess of 40 hours (overtime). She earned a total of $450 for these 48 hours of work. What is her normal hourly wage?

Define your variable. Remember to make it what you are being asked to find. Write it down specifically. Also, define an expression for the overtime wage using *x*. If x is her hourly wage, what is her overtime wage? (If you do not know, use actual numbers. If her hourly wage is $6, her overtime hourly wage is $9. If her hourly wage is $10, her overtime hourly wage is $15. Now, answer the question "If x is her hourly wage, what is her overtime hourly wage?") It's very important you keep straight what you've defined x to be.

Now, think about what you know about the problem. **What we know is that her total salary is the sum of 40 hours paid at her normal hourly wage plus 8 hours paid at her overtime hourly wage. Also, for each component (normal and overtime), the salary earned is the number of hours times the hourly wage.** Try to form, in words, a verbal model that puts all this together.

Use your verbal model to write an equation that we would solve to find Araceli's hourly wage. **Then solve the equation.** Label your answer clearly.

2. I am planning to build a garden with a rectangular fence around it. A neighbor has given me 50 feet of fencing to use; I want to use all of it and nothing else. I need the width to be 2.5 feet longer than the length. What should the dimensions of my garden fence be?

Define your variable. Since we want to know two things, length and width, let *x* represent one of them. Then write an expression for the other using *x*. Make sure they make sense before you go on. (I put actual numbers in to do this. If my width is 5 feet, then my length is 2.5 feet. If my width is 10 feet, my length is 7.5 feet. If I let *x* represent the width, what is the length?) It's very important you keep straight what you've defined *x* to be.

The perimeter of a rectangle is two times the length plus two times the width. Form a verbal model to relate the parts of the problem, length, width, and perimeter.

Use your verbal model to write an equation that we would solve to find my garden's dimensions. **Then solve the equation.** Label your answer clearly.

3. A candy store sells mixed candy boxes containing caramels and nut clusters. Each box sells for $9.50 and has 30 pieces of candy (some caramels and some nut clusters). The caramels sell for $0.25 and the nut clusters sell for $0.45 when sold separately. How many of each should the store put in the box so that the caramels and nut clusters are still worth $0.25 and $0.45 each, respectively? (We do not want to overcharge or undercharge for the candies because we boxed them.)

Define your variable. Since we want to know two things, number of caramels and number of nut clusters, let *x* represent one of them. Then write an expression for the other using *x*. Make sure they make sense before you go on. (I put actual numbers in to do this. If the box has 6 caramels, it has 24 nut clusters. If the box has 15 caramels, it has 15 nut clusters. If the box has 23 caramels, it has 7 nut clusters. If I let *x* represent the number of caramels, what is the number of nut clusters?) It's very important you keep straight what you've defined *x* to be.

The total cost of the box is the cost of the caramels plus the cost of the nut clusters. Form a verbal model to relate the parts of the problem, number of caramels, number of nut clusters, and total cost of the box.

Use your verbal model to write an equation that we would solve to find the number of each candy. **Then solve the equation.** Label your answer clearly.

4. I have $1000 I am going to loan to my sister and brother. My sister is nice to me so I'll charge her 7% simple interest. My brother (who should have been nicer) will be charged 15% simple interest. After they both pay me back, I expect to make $118 in interest. How much am I loaning to each sibling?

Define your variable. Since we want to know two things, the amount loaned to my sister and the amount loaned to my brother, let *x* represent one of them. Then write an expression for the other using *x*. Make sure they make sense before you go on. (I put actual numbers in to do this. If I loan $200 to my sister, I have $800 left to loan to my brother. If I loan $500 to my sister, I have $500 left to loan to my brother. If I loan $900 to my sister, I have $100 to loan to my brother. If I loan *x* dollars to my sister, how much is left over to loan to my brother?) It's very important you keep straight what you've defined *x* to be.

The total interest I will earn is the sum of the interest earned from my sister plus the interest earned from my brother. This is simple interest, so interest earned is the amount times the interest rate (in decimal form.) Form a verbal model to relate the parts of the problem, the amount loaned to each sibling and the total interest I earn.

Use your verbal model to write an equation that we would solve to find the amount loaned to each sibling. **Then solve the equation.** Label your answer clearly.