1.2 Applications of Linear Equations in One Variable

* **Problem-solving for word problems:**
1. Read the problem carefully (2 times) and underline important key words.
2. Transform the question into a variable.
3. Identify any numbers in the problem or math terms.
4. Translate the problem into an equation.
5. Solve the equation.
6. Interpret the results. Does your answer make sense?

Example 1: ***Translating and Solving a Linear Equation:***
The sum of two numbers is 39. One number is 3 less than twice the other. What are the numbers?

Example 2: ***Solving a Linear Equation Involving Consecutive Integers:***
Three times the sum of two consecutive odd integers is 516. Find the integers.

* **Real world application common formula:**
1. $I = PRT$ - Interest = principal $\cdot$ rate $\cdot$ time
2. $d = rt$ - Distance = rate $\cdot$ time
3. $A = lw$ - Area of a rectangle = length $\cdot$ width
4. $C = 2\pi r$ - Circumference of a circle = 2 $\cdot\pi\cdot$ radius
5. Sale tax = cost of merchandise $\cdot$ tax rate
6. Commission = dollars in sales $\cdot$ commission rate

Example 3: ***Solving a Percent Application:***
A woman invests \$5000 in an account that earns 4% simple interest. If the money is invested for 5 years, how much money is in the account at the end of 5 years period?

Example 4: ***Solving a Percent Application:***

A college bookstore uses a standard markup of 40% on all books purchased wholesale from the publisher. If the bookstore sells a calculus book for \$179.20, what was the original wholesale cost?

Example 5: ***Solving Application Involving Principal and Interest :***

Jonathan borrowed \$4000 in two loans. One loan charged 7% interest, and the other charged 1.5% interest. After 1 yr, Jonathan paid \$225 in interest. Find the amount borrowed in each loan.

Example 6: ***Solving a Mixture Application :***

Find the number of ounces (oz) of 30% alcohol solution that must be mixed with 10 oz of a 70% solution to obtain a solution that is 40% alcohol.

Example 7: ***Solving a Distance, Rate, Time Application :***

A hiker can hike 1 mph faster downhill to Moose Lake than she can hike uphill back to the campsite. If it takes her 3 hours to hike to the lake and 4.5 hours to hike back, what is her speed hiking back to the campsite?