Problem Solving and Using Formulas

English → Algebraic Expressions

ex: Four times the sum of 3 and a number.

ex: 5 less than the quotient of a number and 3.

$+$	$-$	$\cdot$	$\div$
sum plus increased by more than added to	difference minus decreased by less than subtracted from	product times of twice	quotient divide per ratio

Ex 1.

A number is two more than another number. The sum of the numbers is 10. What are the two numbers?

Solving a Word Problem

1. Read problem, figure out what it's asking for, and let x represent one of the unknown quantities.
   ex:

2. Write expressions for other unknown quantities.
   ex:

3. Write equation in x based on some part of the problem.
   ex:

4. Solve equation, and answer problem.
   ex:

5. Check solution.
   ex:

Ex 2.

You are choosing between two pay-as-you-go cell phone plans. The one from Me-Tobile is \$15 plus \$0.08 per minute, and the one from Revison is \$3 plus \$0.12 per minute. After how many minutes of usage do the cell phone plans cost the same?

Ex 3.

You buy a Math 71A textbook with a 30% discount for \$87.50. What was the book's price before the discount?

Ex 4.

The length of an American football field is 200 feet more than the width. If the perimeter of the field is 1040 feet, what are its dimensions? (Hint: $P = 2l + 2w$)

Sometimes, we'll want to rewrite a formula (like $d = rt$) so it's solved for a different variable (like $r = \frac{d}{t}$).

Ex 5.

Solve the formula $P = 2l + 2w$ for w.

Ex 6.

Solve the formula $V = \pi r^2 h$ for h.

Ex 7.

Solve the formula $A = P + Prt$ for P. (Note: how do we go from two P's to one P?)

Practice

1. When two times a number is decreased by 3, the result is 11. What is the number?
2. Bustblocker charges \$9 to rent a movie for one week. Membership is free. Fletnix charges only \$4 to rent a movie for one week. Only members can rent from the store and membership is \$50 per year. After how many movie rentals will the total amount spent at each store be the same?
3. After a 40% reduction, you purchase a dictionary for \$57.60. What was the dictionary's price before the reduction?
4. The length of a rectangular pool is 6 meters less than twice the width. If the pool's perimeter is 126 meters, what are its dimensions?
5. Solve the formula $P = C + MC$ for M.
6. Now solve the formula $P = C + MC$ for C.