Part I: Verbal Models

A **Verbal Model** is a word equation that represents a real situation. In other words, it uses words to describe ideas and math symbols to relate the words. No numbers are used in verbal models, but math symbols are important and the model must be true!

The following are some examples of verbal models and how they can be used to help solve problems.

**Sample #1**

You buy 3 boxes of cereal at $3.25 each and one gallon of milk for $2.30. To find how much the groceries will cost, you can use a verbal model to write and evaluate an expression.

\[
\text{Total cost of groceries} = \text{Number of boxes of cereal} \times \text{Cost per box} + \text{Cost of milk}
\]

\[
= 3 \times 3.25 + 2.30 \quad \text{Substitute values.}
\]

\[
= 9.75 + 2.30 \quad \text{Multiply first.}
\]

\[
= 12.05 \quad \text{Then add.}
\]

**Answer:** The cost of the groceries is $12.05.

**Sample #2**

Jenny bought a shirt for her brother for his birthday. The shirt was $23. She left the store with $9. How much money did Jenny have before she bought the shirt?

**Solution**

You can use a verbal model to write an equation. Let \( a \) represent the amount of money Jenny had before she bought the shirt.

\[
\begin{array}{c|c|c|c|c}
\text{Original amount} & \text{Amount spent on shirt} & \text{Amount left over} \\
\hline
a & 23 & 9 \\
32 & 23 & 9 \\
\end{array}
\]

**Answer:** Because \( a = 32 \), Jenny had $32 before she bought the shirt.
Homework Exercises:

Decide whether each of these verbal models is true or false for the given situation. If it is false, correct the labels to make it true.

1. _______ Number of chickens + number of pigs = total number of animals.
2. _______ Money earned − money spent = profit
3. _______ Cost of eggs + cost of bread = cost of apples
4. _______ Perimeter = length + width
5. _______ Miles per hour × # of hours = time traveled
6. _______ Total cost = amount of down payment + monthly payment × number of items
7. _______ Batting average = Number of hits ÷ number of times at bat
8. _______ Monthly fee + charge for each text × number of texts = total cell phone bill
9. _______ Number of teams = number of players on each team ÷ total number of players
10. _______ Price per sweater × number of sweaters + tax = total bill

Now you fill in some blanks! Remember the equation must be TRUE!

11. Change in temperature = __________________________ − start temperature
12. Length of mission = length of flight to moon + time spent on moon + __________
13. Cost of new parts + cost per hour of labor × __________________________ = total cost
14. Admission price × _______________ + Popcorn price × _______________ = total cost
15. Distance ball has already dropped + _______________ = total distance ball drops
16. People in theatre = seats per row × _______________
17. Cost to join + number of songs downloaded × _______________ = total cost
18. Total pages = weeks left × pages per week + _______________
19. Total number of people ÷ number of hotdogs per package = _______________
20. Grade for a class = total points earned ÷ _______________

OVER →
21. Read the following verbal model:

\[
\text{Money spent on frozen pizza} = \text{Money spent on groceries} - \text{Money spent on vegetables, chicken, and milk}
\]

a. Write a story problem that this verbal model could represent.

b. Fill in the numbers from your story problem into the equation represented by the verbal model and solve your problem.

22. For the following story problem, write a verbal model and then use it to solve the problem.

You buy 3 notebooks at $2 each and 4 pens at $1.50 each. What is the total cost of your purchase?

a. Verbal Model

b. Solution

PART II: Writing about math
You will soon find out that many math problems will be followed with the directions Describe or Explain or Explain your reasoning.

23. In your own words, state what you are being asked to do when you see each of the following terms as part of a math question.

a. Describe

b. Explain

24. Use the graph at the right. Describe how the data changed during the years shown. What might explain the rapid growth in sales of DVD players? What might cause the growth to slow down in the future? Explain your reasoning. (Write several sentences.)