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Daily Warm-Ups

MATH PROBLEM SOLVING

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Level II

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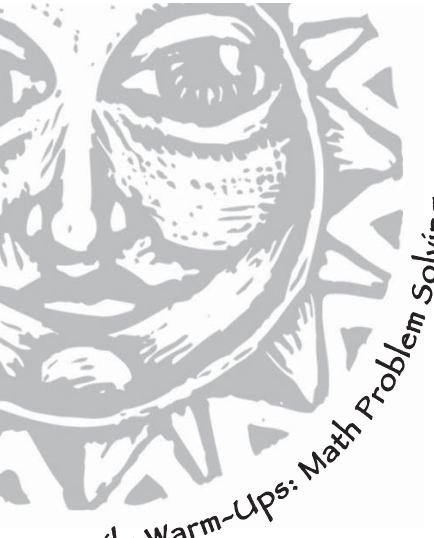
The *Daily Warm-Ups* series is a wonderful way to turn extra classroom minutes into valuable learning time. The 180 brief activities—one for each day of the school year—practice problem solving skills. These daily activities may be used at the very beginning of class to get students into learning mode, near the end of class to make good educational use of that transitional time, in the middle of class to shift gears between lessons—or whenever else you have minutes that now go unused.

Daily Warm-Ups are easy-to-use reproducibles—simply photocopy the day's activity and distribute it. Or make a transparency of the activity and project it on the board. You may want to use the activities for extra-credit points or as a check on the problem solving skills that are built and acquired over time. This collection of warm-ups includes an assortment of problems addressing various skills and requiring varying degrees of prior knowledge. The problems vary in their level of difficulty and the amount of time it will take to solve them.

However you choose to use them, *Daily Warm-Ups* are a convenient and useful supplement to your regular lesson plans. Make every minute of your class time count!

Daily Warm-Ups: Math Problem Solving



Working Backward

Sometimes, the information provided in a math problem is so complete that there is only one thing left that you don't know: the answer.

Imagine that you have a bag of 200 marbles. There are 28 green marbles, 21 yellow marbles, 24 blue marbles, 34 red marbles, 15 black marbles, 20 white marbles, and 27 orange marbles. The remaining marbles are purple. How many purple marbles are in the bag?

Look It Up!

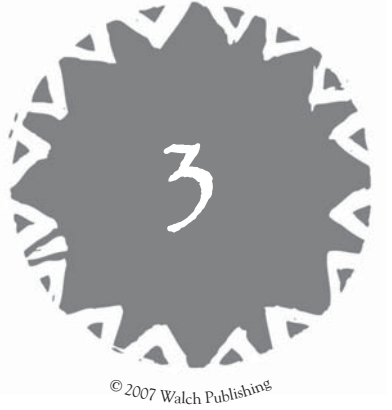
Don't be afraid to use resources beyond yourself to solve a problem. Some math problems don't provide you with enough information. You may have to ask your teacher for more information, go to the library to get a book on the subject, or search the Internet for the missing facts.

For instance, say you need to determine how long it takes for light from the Sun to reach Jupiter. If you know that Jupiter is, on average, 778,412,027 kilometers from the Sun, you only need the speed of light to determine the answer. Find the speed of light to the nearest kilometer per second. Then determine the amount of time it takes light to travel from Jupiter to the Sun.

Drawing a Picture

Sometimes descriptions in math problems are unclear. This is especially true of problems involving geometric figures. Drawing a picture of the described situation can often make the question easier.

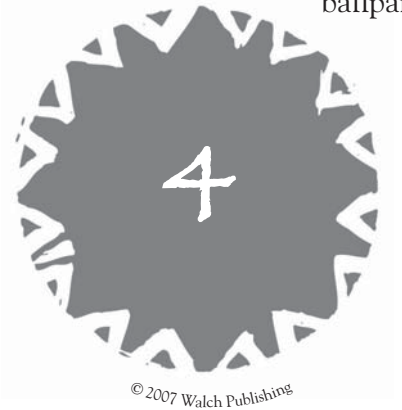
A square that is 10 centimeters on a side contains a circle that touches the inside of the square on all four sides. What is the area of the space outside the circle but inside the square? Draw a diagram in the space below, and then determine the area.

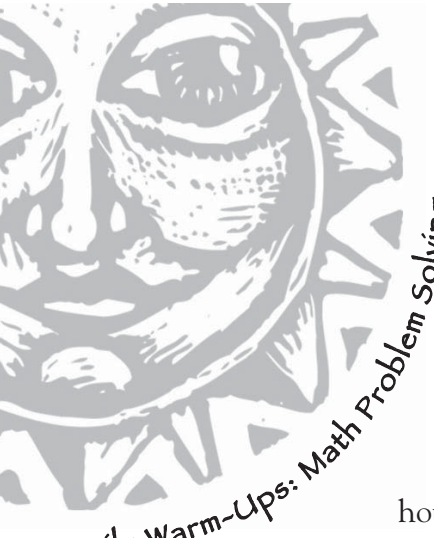


Come Again?

The amount of information in some word problems can be overwhelming. As you go through the various steps of solving such a problem, you may have to go back and check the facts and the final question over and over.

Suppose that you and three friends go to the ballpark. You each buy a ticket for $15.25, you each get a soda for $1.35, three of you buy a hot dog for $4.50 each, two of you get a hamburger for $5.75 each, two of you get cotton candy for $1.75 each, and one of you pays for the parking that costs $11.50. What is the average cost per person for the trip to the ballpark?





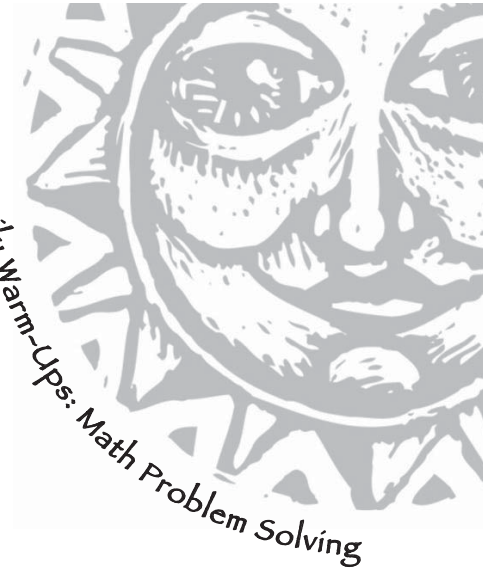
Just the Facts

Many math problems include extra information to make sure you understand which facts are needed and which facts are not.

Read the problem below. Underline the facts you need to solve the problem, and then find the answer.

You go for a drive in your car on March 20 and travel at 65 miles per hour while on the highway. You get gas when you return home and buy 14.5 gallons. You also get a soda for $1.99 and notice that the temperature on a nearby digital bank sign is 84°. You spend 4 hours on the highway, and you pay three tolls totaling $12.60. How far did you travel on the highway?

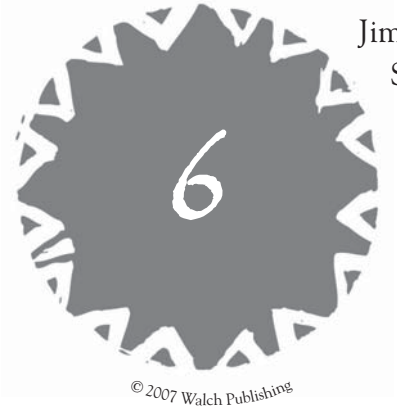
Rewrite the Problem

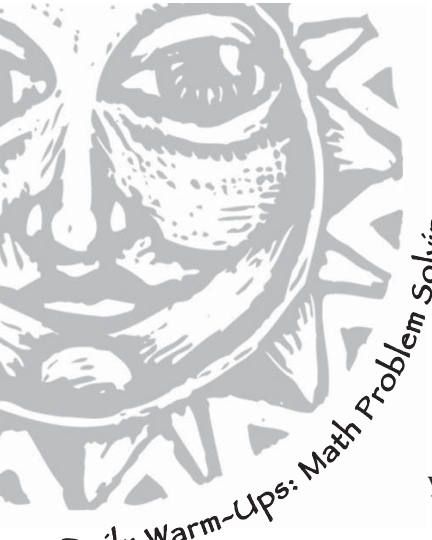


The information in a problem is not always organized clearly. Rewriting the problem in a way that makes more sense can be a good way to clarify the information and help you solve the problem.

Read the problem below. Rewrite the problem in a simpler way, and then find the answer.

At the big relay, Jim ran 2.4 kilometers, George ran 3.1 kilometers, and Steve ran 1.7 kilometers. Then George ran 3.4 kilometers, Steve ran 2.9 kilometers, and Jim ran 2.3 kilometers. Next Steve ran 8.8 kilometers, Jim ran 5.5 kilometers, and George sat out. Finally, George ran 12.2 kilometers, Steve ran 11.9 kilometers, and Jim ran 12.6 kilometers. How far did each person run?





Your Own Words

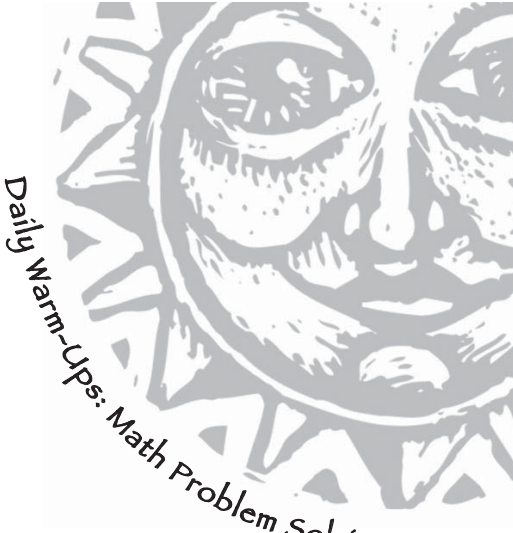
The language of math is filled with technical terms. Often, math problems contain long explanations. You might find it easier to rewrite a problem using language that is more comfortable to you.

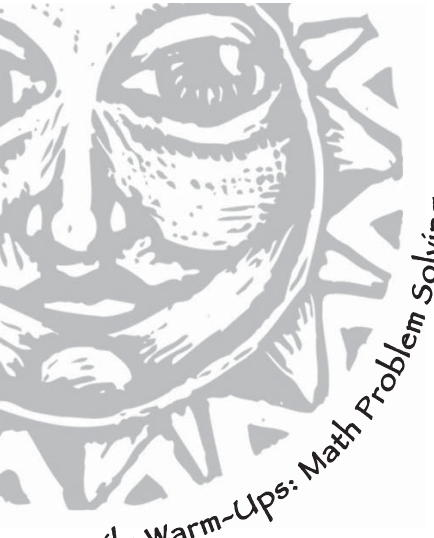
The formula for the surface area of a cylinder is $S = 2\pi r^2 + 2\pi rh$, where r is the radius of the top or bottom of the cylinder and h is the height. Describe in your own words what this formula is telling you to do.

Make an Analogy

An analogy is a comparison that helps explain something by showing the similarity between two things. For instance, the fraction $\frac{3}{8}$ can be compared to a pizza that is cut into 8 pieces; 5 of the pieces are gone, and 3 pieces remain.

Make an analogy for the following equation: $52 - x = 47$. Then solve the equation.





Finding Patterns

A collection of data often has so many pieces that it becomes difficult to tell how the pieces are all related. Putting a group of numbers in order or graphing them can help you see a pattern when the raw data does not make it clear.

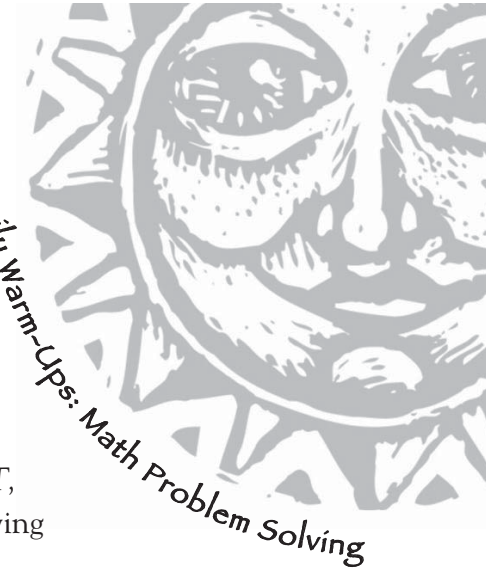
Use the group of numbers below to answer questions that follow.

36, 21, 1, 31, 11, 4, 26, 9, 16, 6, 34, 29, 19, 14, 24

1. Find the pattern in the group of numbers above. (*Hint:* Put the numbers in order first.)

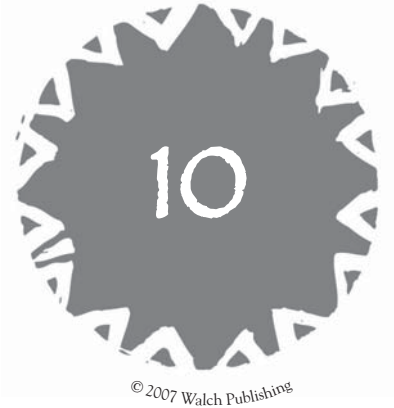
2. Would you have been able to find the pattern if you had not put the numbers in order? Why or why not?

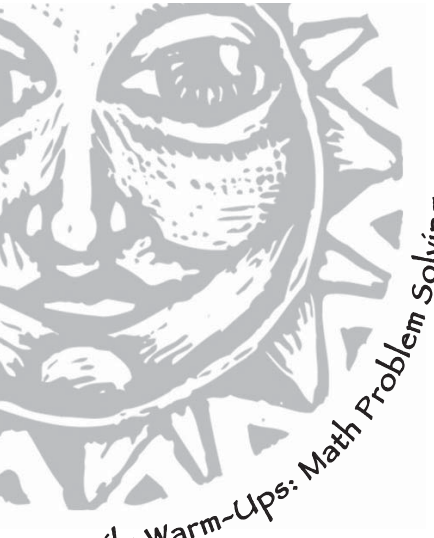
Make a List



If you don't know a formula to solve a certain kind of problem, you may have to use a method that is more time-consuming. Sometimes you have to carefully keep track of your work as you go to determine if you are solving the problem.

Suppose you have to organize a meeting in which four speakers are going to present information. What are all the possible orders they could go in? Imagine that the speakers' names begin with the letters *S*, *T*, *A*, and *R*. Using those letters to represent the speakers, make a list showing all the possible orders.





Make a Table

A table is a tool that can be used to both collect information and to sort that information while it is being collected.

Make a frequency table for the heights of the people in your class. Split the range of heights into six groups: under 5', 5'–5'4", 5'4"–5'8", 5'8"–6', 6'–6'4", and 6'4"–6'8". Which of the six groups contains the largest percent of the heights?