

Daily Warm-Ups

MATH IN REAL LIFE

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Level II



<i>Introduction</i>	<i>iv</i>
Consumer Math	1
Basic Math	57
Tables, Charts, and Graphs	106
Algebra and Geometry	120
Data Analysis and Probability	154
<i>Answer Key</i>	181



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Adding Coins

Many transactions in real life involve the handling of money. The smallest units of money in the United States are the penny, the nickel, the dime, and the quarter. The penny is worth 1 cent, the nickel is worth 5 cents, the dime is worth 10 cents, and the quarter is worth 25 cents. 100 cents is equal to 1 dollar.

Determine the total value of each combination of coins below without using a calculator. Write the value on the line.

1. 1 nickel, 3 pennies, 2 dimes _____
2. 2 quarters, 2 dimes, 2 nickels _____
3. 5 nickels, 5 dimes, 3 pennies _____
4. 1 nickel, 1 penny, 1 quarter, 1 dime _____
5. 4 pennies, 12 nickels, 1 dime _____
6. 2 quarters, 2 pennies, 3 nickels _____



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Comparing Coins

Coins can be combined in many different ways. A large stack of coins may or may not have more value than a small stack of coins. For example, 50 pennies (50 cents) has less value than a much smaller stack of 11 nickels (55 cents). Sometimes a larger stack of coins does have a greater value than a small stack. For example, 75 pennies (75 cents) is worth more than 7 dimes (70 cents).

Determine which combination of coins below represents the greatest amount of money without using a calculator.

- a. 53 pennies, 1 dime, 1 nickel
- b. 1 quarter, 4 dimes, 1 nickel
- c. 1 quarter, 3 dimes, 9 pennies
- d. 2 quarters, 10 pennies, 1 nickel
- e. 3 quarters
- f. 5 dimes, 4 nickels, 3 pennies





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Distance Between Points

There are many ways to measure distance. There is the straight distance between two points, or the distance traveled by the path of a car traveling between two locations. The distance traveled by a car is almost always longer than the straight-line distance between the two places.

You go on a road trip and travel 575 miles according to the car's odometer. When you use a ruler to measure the straight-line distance in your atlas, however, you note a distance of 512 miles.

Answer the following.

1. What is the difference between the distance measured with the odometer and the distance shown in the atlas?
2. List five things that could occur during a car trip that could account for the difference in the two distances.
3. What form of transportation allows you to travel in a straight line?



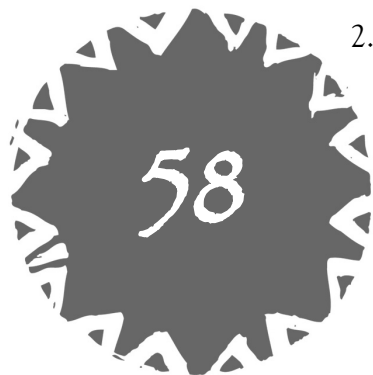
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Rate

Rate is a measure of something that happens in a given amount of time. The number of miles traveled in an hour, the number of sodas bottled in a factory in a day, and the number of times the earth rotates in a year are all rates. Rate can be calculated by dividing the events or number of items by the time in which the events happen or the items are counted.

Answer the following questions.

1. In one factory, 50,000 toothpicks were made in 8 hours. What is the rate in toothpicks per day?
2. A car travels 500 kilometers in 6 hours. What is the rate in kilometers per hour?
3. A factory makes 150,000 gallons of gasoline in a day. What is the rate of production in gallons per year?
4. A farmer on a giant goat farm sells two goats every day. What is the rate of goats sold in goats per week?



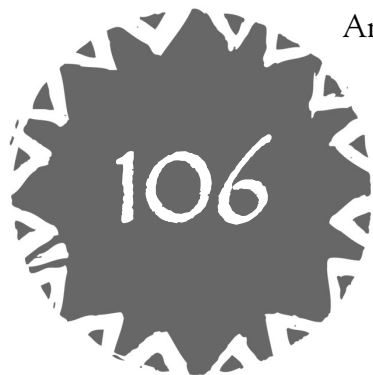
Reading Tables

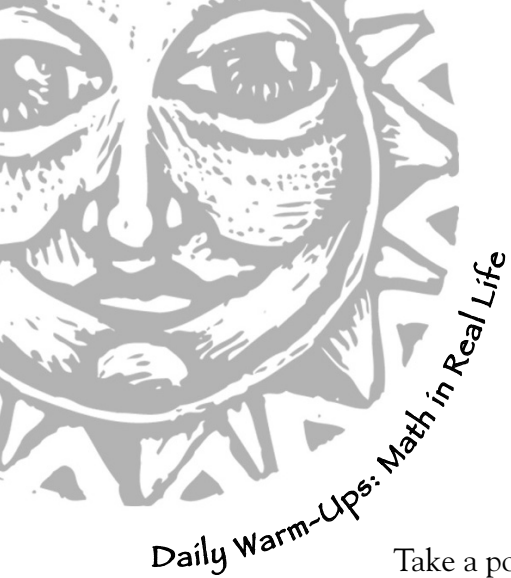
In a physical science class such as chemistry or physics, information is often presented in a table format. Tables such as the one below are often found in the appendix of a chemistry text. You don't have to understand all the information presented in order to use the table.

Element	Symbol	Atomic number	Molar mass (g/mol)	Density (g/cm ³)	Melting point (°C)	Boiling point (°C)
argon	Ar	18	39.95	1.66	-189	-186
carbon	C	6	12.01	2.27	3700	—
gold	Au	79	196.97	19.28	1064	2807
iron	Fe	26	55.85	7.87	1540	2760
titanium	Ti	22	47.88	4.55	1660	3300

Answer the following about the chart above.

1. Which element has the highest density?
2. Which element has the highest melting point?
3. Which element has a symbol of Fe?
4. Which element has the lowest molar mass?
5. Which element has the highest boiling point?





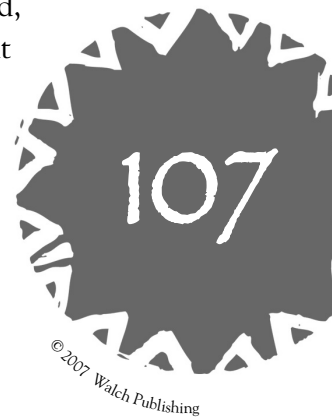
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Organizing a Table

You can collect information in a number of ways. You might use an informal poll in which you ask a few friends, for example, “What movie do you want to go see?” You might use a more extensive method, such as if you were polling all the people who came into a supermarket to see what kind of produce they were buying. As you collect data, you will quickly find that you can only keep track of so many pieces of information, and that it is hard to find a pattern unless you organize the data to look at it.

Take a poll of at least 10 people and collect the following information: gender, age, height, favorite color, favorite movie, favorite snack food, favorite web site, and one other item of your choice. Organize your data so that it is in a single table, and then answer the questions below.


1. Is there a connection between gender and any other trend? Explain.
2. Is there a connection between age and any other trend? Explain.
3. Is there a connection between favorite color and favorite snack food? Explain.



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High Jump

A person trying to get over the bar at the high jump is trying to build up a lot of kinetic energy (the energy of motion) and then convert that into gravitational potential energy (energy stored as an object is lifted against gravity). The best high jumpers are those who can most effectively convert their kinetic energy to potential energy. The formulas for kinetic and potential energy can be combined to show that $v = \sqrt{2gh}$, where v is the velocity (in meters/second), g is the acceleration due to gravity ($9.8 \frac{m}{s^2}$), and h is the person's height above the ground in meters.



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Solve each problem below.

1. How fast should a person be running to get 2.2 meters above the ground?
2. What height can be achieved by a person running at 6.3 meters per second?
3. How fast should a person be running to set a world record height of 2.6 meters?
4. What height, theoretically, could a person running at 10 meters per second achieve?





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Calories per Day

The number of calories you should consume daily depends on your height, weight, age, gender, and activity level. Use the formulas below to calculate the number of calories needed daily. For each formula, a low activity level (little to no exercise) is worth 1.1, a medium activity level (some regular exercise) is worth 1.5, and a high activity level (training for competition) is worth 2.0. To find your weight in kilograms, divide your weight in pounds by 2.2. To find your height in centimeters, divide your height in inches by 2.54.

$$\text{Males: activity level} \times [66 + (\text{weight in kilograms} \times 13.7) + (\text{height in cm} \times 5) - (\text{age} \times 6.8)]$$

$$\text{Females: activity level} \times [655 + (\text{weight in kilograms} \times 9.6) + (\text{height in cm} \times 1.85) - (\text{age} \times 4.7)]$$

Complete the following.

1. Determine the number of calories you should eat in a day.
2. Determine the number of calories three of your classmates should eat in a day. Be sure to do the calculations for each gender.



Survey

Advertisers like to know how well they are matching their products to the consumers who are likely to buy them. By polling and surveying groups of people, advertisers can find out how effective their ads are. When a survey is conducted, a respondent can give any answer he or she chooses instead of selecting from a list of possible responses.

Take a survey of your classmates to find each person's favorite color. Draw a bar graph to show the results. Then answer the following questions.

1. What was the most common response?
2. What was the least common response?





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The Survey Says . . .

A local radio station is doing a survey at a nearby mall. You and your friends agree to answer some questions about your favorite music to get your choice of a free CD or some music downloads. Two weeks later, the station sends you a copy of the results of their survey. According to the survey, 18% liked country music, 22% liked rap and hip-hop, 30% liked pop/rock, 9% liked classical, and the remaining 21% liked jazz, blues, gospel, bluegrass, dance music, oldies, or classic rock.

Answer the following questions.

1. Why would a radio station be interested in the types of music that people enjoy?
2. What type of music was liked by the most people?
3. Is the mall the best place for this type of survey? Why or why not?
4. Based on the results of the survey, what age group spends a lot of time at the mall?

