

**Interpreting Problems**

Draw a picture of each situation below.

1. A scientist wants to study 24 stars. He studies  $\frac{1}{3}$  of them one week, and  $\frac{1}{4}$  of the remainder the next week. How many are left to study?

2. An observatory has selected 36 stars to study. Dr. Sagan studies  $\frac{2}{3}$  of them, and Dr. Halley studies  $\frac{3}{4}$  of them. What is the smallest number of stars that could have been studied by both scientists?

3. A laboratory orders 3 microscopes, 2 cameras, and 3 identical tripods. Each microscope costs \$57.25 and each camera costs \$557.75. If the total bill is \$1423.75, how much did each tripod cost?

## Weighty Problems

### Problem 1

Sandra eats about 2000 calories per day with 40% of her calories from fat. Fat has about twice as many calories per gram as carbohydrates or proteins. If she eats the same amount (in grams) each day, but replaces half of her fat grams with carbs or protein, how many calories does she save?

If 3500 calories extra is enough to gain a pound, and a 3500 calorie deficit is enough to lose a pound, how long will it take Sandra to lose one pound based on the plan above?

### Problem 2

Mark wants to lose a few pounds so he decides to change his exercise plan. He usually watches TV for 30 minutes after he gets home from school. He finds that walking a mile burns 114 calories, and swimming burns 243 calories in the same 20 minute exercise period. He decides to walk one day and swim the next, alternating the two activities until he meets his weight loss goal. How long will it take him to burn the 3500 calories required to lose one pound by using this method?

### Problem 3

For a person to find out how many calories they need per day, they should first convert their weight in pounds to kilograms (1 kilogram is about 2.2 pounds). Women should then multiply this number by 0.9. The resulting number is multiplied by 24. That is the number of calories needed to maintain this weight with no activity factored in. Next multiply by an activity factor: 1.3 for sedentary lifestyles, 1.5 for light activity, 1.7 for moderate, and 1.9 for heavy.

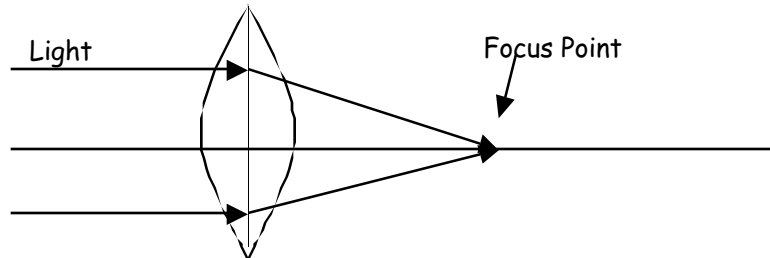
Sue weighs 120 pounds and is moderately active. How many calories does she require per day to keep her same weight?

### Problem 4

Tom likes to drink an average of two bottles of soft drink per day. Each bottle has 20 ounces. On the label, he reads that an 8-ounce serving has 97 calories. If Tom replaces these two bottles of soft drink with water, how many calories will he save per day? How long will it take him to save the 3500 calories required to lose one pound?

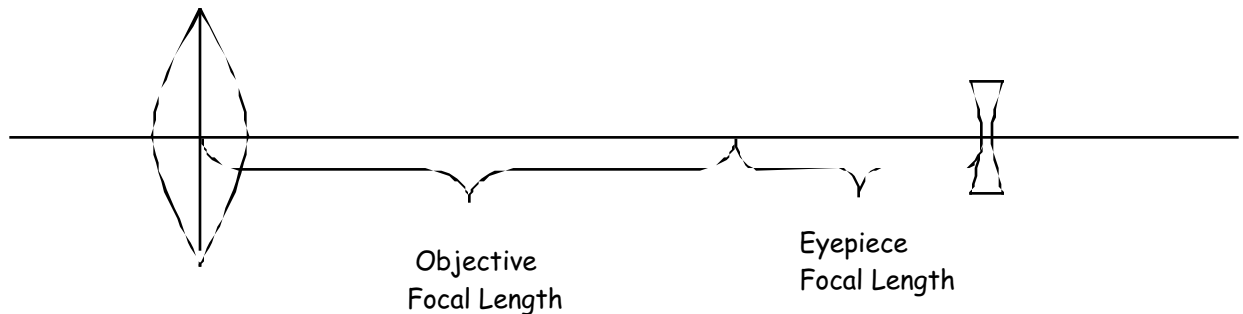
## How a Simple Telescope Works

The simplest telescope, such as the one Galileo made, has only two lenses. One lens, called the objective lens, is large to gather lots of light and it focuses the light from distance objects to one point. The distance from the lens to the focus point is called the focal distance.



This lens actually makes things smaller.

But there is another lens in the telescope, close to the eye. It is called the eyepiece lens. It is usually smaller in diameter, closer to the size of an eye. This lens makes things appear larger. It also has a focal length. The diagram below, shows how these lenses should be arranged in a simple telescope.



The power of the telescope is how many times it magnifies things. If I want a telescope that makes things look 5 times as big as they normally look, I need to find lenses so that the focal length of the objective lens is 5 times as big as the focal length of the eyepiece lens.

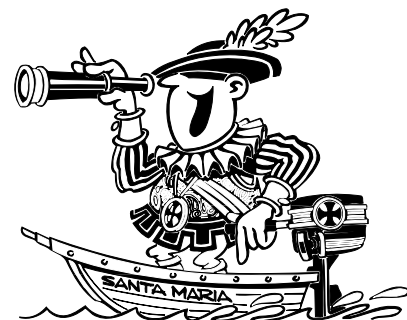
1. If a telescope has an eyepiece lens with a focal length of 0.15 meters and an objective lens with a focal length of 0.45 meters, how far should the two lens be from each other in the telescope?
2. If a telescope has an eyepiece lens with a focal length of 12 cm, and we wish it to make things six times bigger than normal, what should the focal length of the objective lens be? How long would this telescope have to be?
3. A telescope has an eyepiece lens with focal length of 150mm and an objective lens with a focal length of 450 mm. How many times does this telescope magnify objects?

Acme Science Supply

# Acme Science Supply

<b>Refractor Lens</b>	<b>\$ 7.50</b>
<b>Eyepiece lens</b>	<b>\$ 4.25</b>
<b>Telescope Tube</b>	<b>\$ 1.85</b>
<b>Planet models</b>	<b>\$ 2.75</b>
<b>Wire</b>	<b>15 cents per foot</b>
<b>Styrofoam balls (various sizes)</b>	<b>6 for \$1.00</b>
<b>Special Sale</b>	
<b>Moon globe</b>	<b>\$15</b>

1. To make a telescope, John needs two telescope tubes, a refractor lens and an eyepiece lens. How much will this cost?
2. To make a model of the solar system, Susan is going to use 12 styrofoam balls and 90 feet of wire. How much will this cost?
3. Leonard has just enough money to buy a refractor lens and an eyepiece lens. If he doesn't buy those, how much more will he have to save to buy the moon globe?
4. Mike spent \$29.75 buying 9 planet models and 4 comic books. How much did each comic book cost?



Name \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Round each check amount up to the nearest dollar, then subtract from the checkbook total. Complete the chart, and then answer the questions at the bottom of the page.

**Bill's Dad's checks for the month of October.**

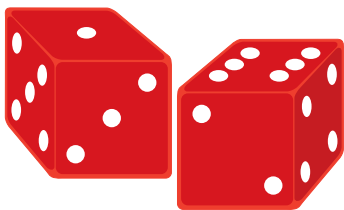
- |                     |         |                  |         |
|---------------------|---------|------------------|---------|
| 1. Dry cleaner's    | \$18.34 | 2. Grocery store | \$79.02 |
| 3. Department store | \$67.45 | 4. Gas Bill      | \$49.98 |
| 5. Electric Bill    | \$43.76 | 6. Phone Bill    | \$52.07 |
| 7. Grocery store    | \$87.43 | 8. Shoe store    | \$29.27 |
| 9. Petsmarty        | \$63.49 | 10. Walmark      | \$24.85 |

Beginning Total	Actual Check	Dad's Register	New Total
\$600.00			

1. About how much money do you think Bill's dad saved by doing his checkbook this way? \_\_\_\_\_
2. How much did he actually save? \_\_\_\_\_
3. Would it be a good idea for someone to round their check values down instead of up? Why or why not?

## Exponent Dice

roll	base	exponent	factors	product
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

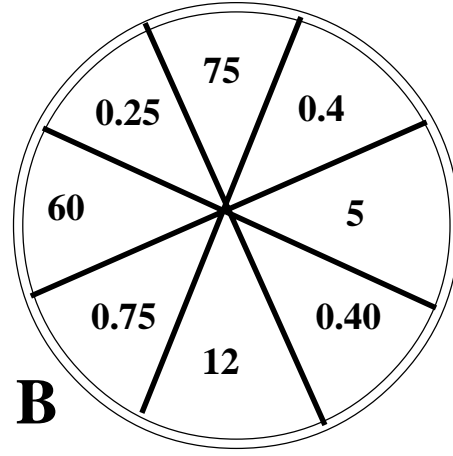
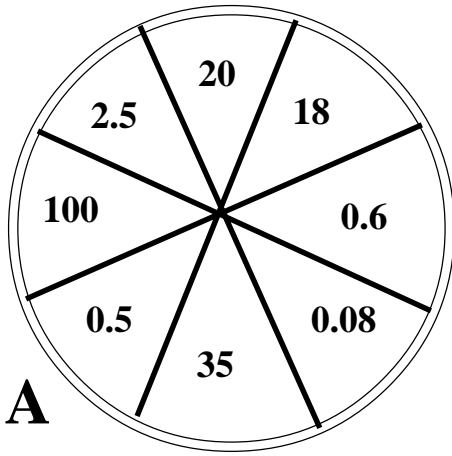


**Rational Number Operations II**

Round	A	B	sum	difference	product	quotient
1	$\frac{3}{5}$	$\frac{1}{8}$				
2	$\frac{4}{6}$	$\frac{1}{3}$				
3	$\frac{5}{6}$	$\frac{1}{12}$				
4	$\frac{3}{4}$	$\frac{1}{2}$				
5	$\frac{7}{8}$	$\frac{1}{10}$				

1. Which round(s) give larger results than A or B?
2. Why?
3. Which round(s) give smaller results than A or B?
4. Why?

# Rational Number Operations I

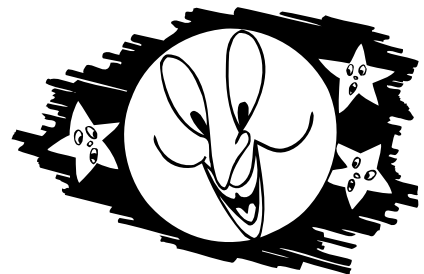


spin	A	B	product	quotient	spin	A	B	product	quotient
1					10				
2					11				
3					12				
4					13				
5					14				
6					15				
7					16				
8					17				
9					18				

## Comets in the News

According to astronomers, a visible comet will appear in our skies about once every 20 years.

1. About how many comets have been visible in our skies since the airplane was invented?
2. About how many comets have been visible in our skies since your grandfather was born?
3. About how many comets can you expect to see in the remainder of your lifetime?
4. About how many comets will be visible on Earth from the year 2000 until the year 3000?
5. Since three spectacular comets were witnessed from 1994-1997, does this mean we will not see any more comets for 60 years? Explain your answer.
6. Comet Hale-Bopp has a diameter of 25 miles (40 km). Find two towns in our state that are about that distance apart.
7. What would the circumference of Hale-Bopp be? Find two towns in our state that are about that distance apart.
8. Comet Hyutakewhich appeared in 1996 had the longest tail ever seen on a comet. It was 100 degrees long. Pretend that you were wearing a Hefty plate on your head on a night when the comet was observed. Let the indentations along the rim represent your view of the sky all around. Color in enough indentations to represent 100 degrees.



1. Carowinds™ ticket costs are \$42.99 for adults and \$25.99 for children. Jack needs to purchase 4 adult tickets and 5 children's tickets. Is \$450 a reasonable amount of money for the tickets? Why or why not?

2. Barb's family is taking a break at the park for lunch. She takes them to the Chicken Stand where the chicken finger lunch costs \$6.99 with a drink and the chicken dinner costs \$8.95 but drinks are \$1.50 extra. She orders 5 chicken finger lunches and two chicken dinners and two sodas. If she only has \$50 to spend, is her order reasonable? Why or why not?

3. The sixth grade class is taking a day trip to Carowinds™. They have 6 hours to spend at the park. John and Dave want to ride as many rides as possible; however, they know that they will definitely ride Top Gun. The wait at Top Gun is one hour. The average wait for all the other rides is 45 minutes. Is it reasonable to think that they can ride 6 rides\* by the end of the day? Why or why not?

(\*Take into account that walking between rides will take 5-10 minutes.)

4. Gina and Diane are in line for the bumper cars at 4:00 p.m. The bus leaves the park at 5:00 p.m. Since some people ride single and others double, each turn on the bumper cars holds between 20 and 40 passengers. Gina estimates there are 75 people in line in front of them. Each ride takes 15 minutes. Is it reasonable to think that they will be able to ride the bumper cars before leaving for the day?

Why or why not?

5. Tyrone brought some spending money on his trip. He would like to buy a souvenir for everyone in his family. He lives with his parents, grandparents and 3 brothers and sisters. In the souvenir shop, the prices range from \$1.95 to \$12.95. He has only \$20 to spend. Is it reasonable to buy each person a gift for \$2.99?

Why or why not?

6. Terry and Deshawn want to spend their day in the Water Park. Their goal is to ride every water ride least one time. If the average time per ride, including wait time, is 35 minutes, is it reasonable for them to be able to ride all 14 water rides in 6 hours?

Why or why not?

## *Scientifico Gameboards*

<b>Between 1 and 50</b>	<b>Between 51 and 100</b>	<b>Between 101 and 500</b>	<b>Between 501 and 1000</b>
<b>Between 1001 and 5000</b>	<b>Between 5001 and 10,000</b>	<b>Between 10,001 and 50,000</b>	<b>Between 50,001 and 100,000</b>
<b>Between 100,001 and 500,000</b>	<b>Between 500,001 and 1,000,000</b>	<b>Between 1,000,001 and 5,000,000</b>	<b>Between 5,000,001 and 10,000,000</b>
<b>.000001 to .0000049</b>	<b>.000005 to .000009</b>	<b>.00001 to .000049</b>	<b>.00005 to .00009</b>
<b>.0001 to .00049</b>	<b>.0005 to .0009</b>	<b>.001 to .0049</b>	<b>.005 to .009</b>
<b>.01 to .049</b>	<b>.05 to .09</b>	<b>.1 to .49</b>	<b>.5 to .9</b>



