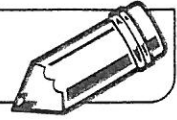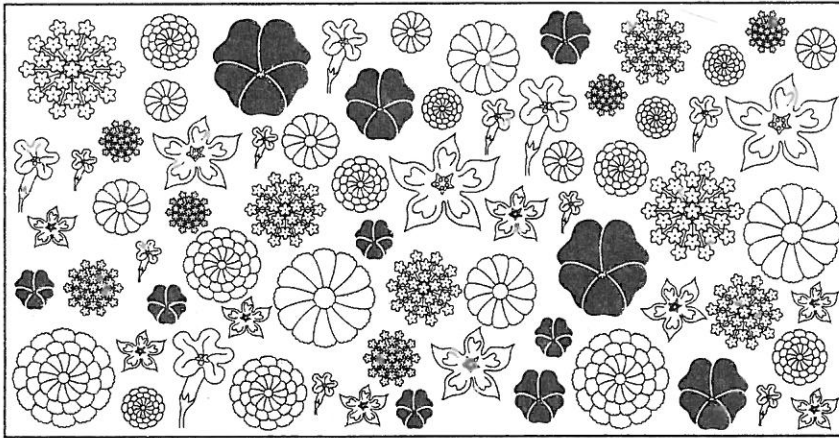**LESSON 2•1**  **Estimation Strategies**

1. Rosie wants to estimate the number of flowers in this picture. Her estimation strategy has 3 steps. Find the 3 steps in the list of strategies below.

   Write 1 next to the step that you think should be done 1st.
   Write 2 next to the step that you think should be done 2nd.
   Write 3 next to the step that you think should be done 3rd.



   _____ Count every flower.

   _____ Count the number of flowers in one section.

   _____ Make a guess.

   _____ Multiply this number by 4.

   _____ Ask someone how many flowers are in the picture.

   _____ Draw lines to divide the picture into four equal sections.

2. Could you use Rosie's strategy to estimate only
   the number of all-black flowers in the picture? _____

3. Explain why or why not.

   _____

   _____

   _____

   _____

   _____

**LESSON 2·2** | **Place-Value Strategies**
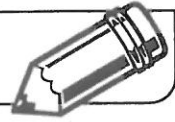
Use your favorite addition algorithm to solve the first problem in each column. Then use the answer to the first problem in each column to help you solve the remaining problems.

| 1. | 3,058 <br> + 2,182 | 2. | 7,401 <br> + 2,659 |
|---|---|---|---|
| a. | 3,058 <br> + 2,282 | a. | 7,401 <br> + 2,679 |
| b. | 3,058 <br> + 2,082 | b. | 7,401 <br> + 2,669 |
| c. | 3,058 <br> + 2,582 | c. | 7,401 <br> + 2,689 |
| d. | 3,058 <br> + 2,181 | d. | 7,401 <br> + 2,699 |

3. Explain the strategy you used to solve the problem sets above.

_____

_____

_____

_____

**LESSON 2·4**

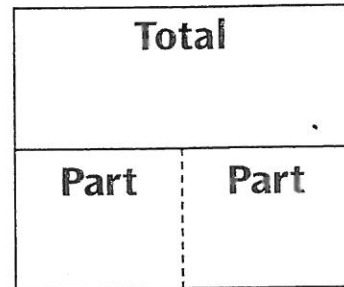# Using Situation Diagrams
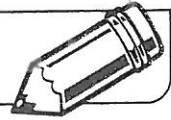
◆ Use the information in each problem to fill in the diagram.

◆ Use a ? to show the missing number.

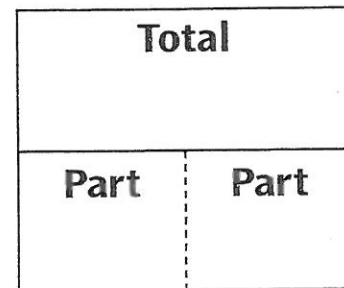◆ Write an open number sentence with the information from the diagram.

1. Two angles of a triangle measure 45° and 55°.
   What is the sum of the measures of the two angles?

   Open number sentence: _____

   | Total | |
   |-------|---|
   | Part | Part |

2. There are 64 orange and green tennis balls in a basket.
   If 35 of them are orange, how many tennis balls are green?

   Open number sentence: _____

   | Total | |
   |-------|---|
   | Part | Part |

3. Elvin had $15.00 to spend at the school bazaar. He spent $12.75. How much money did he have left?

   Open number sentence:
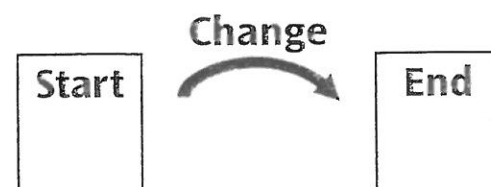
   _____

   **Start** | **Change** → | **End**

4. a. At 7 A.M., the temperature is 76°F. The temperature is expected to drop 17° by 4 P.M. What will the temperature be at 4 P.M.?

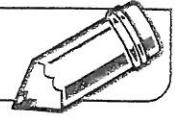   Open number sentence:

   _____

   **Start** | **Change** → | **End**

   b. What would the temperature be at 4 P.M. if the temperature increased by 17°?

   Open number sentence:

   _____

   **Start** | **Change** → | **End**

## LESSON 2·4 Writing Open Number Sentences

Write an open number sentence and solve the problem.

1. Chan brought his collection of 1,500 sports cards to school. He has 156 basketball cards and 625 football cards. The rest were baseball cards. How many baseball cards did Chan bring?

   a. Open number sentence: _____

   _____

   b. Solution: _____  c. Answer: _____
   
   (unit)

2. Abdul took a bus downtown to see a movie. The bus ride to the theater took 15 minutes. If the movie was $2\frac{1}{4}$ hours long, how many hours and minutes was Abdul away from home?

   a. Open number sentence: _____

   _____

   b. Solution: _____

   c. Answer: _____
   
   (unit)

3. Julie paid $14.08 to fill her gas tank with 10 gallons of gas before starting a trip from Chicago to Topeka, Kansas. After driving about 305 miles, she bought 10 more gallons of gas in Iowa and paid $11.85. How much more did she pay for a gallon of gas in Chicago than in Iowa?

   a. Open number sentence: _____

   _____

   b. Solution: _____  c. Answer: _____
   
   (unit)

## LESSON 2·5  Decimal Number-Line Puzzles
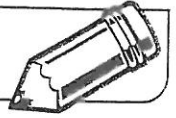
**Step 1:** Clear your calculator. Look at the number line.

**Step 2:** Enter the end number, subtract the start number, and divide by the number of jumps between. The result is the interval number.
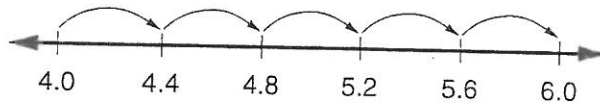
**Step 3:** Enter the start number and add the interval number. This is the first missing number. Add the interval again to get the next missing number, and so on.
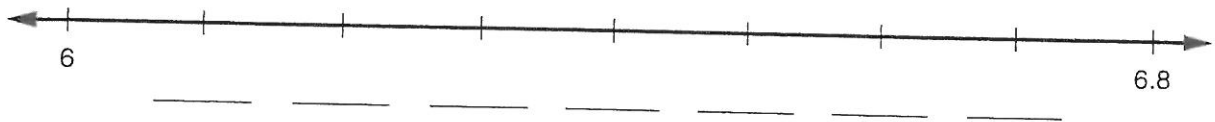
**Example:**

End number − start number = difference   6 − 4 = 2

Difference ÷ hops = interval   2 ÷ 5 = 0.4

4 + 0.4 = 4.4; 4.4 + 0.4 = 4.8; 4.8 + 0.4 = 5.2; 5.2 + 0.4 = 5.6; 5.6 + 0.4 = 6.0

```
       4.0    4.4    4.8    5.2    5.6    6.0
```

**1.** Jumps: _____

```
   6                                              6.8
```
___  ___  ___  ___  ___  ___  ___

**2.** Jumps: _____

```
    1.4                                           4.2
```
___  ___  ___  ___  ___  ___

**3.** Jumps: _____

```
   1.34                                           9.38
```
___  ___  ___  ___  ___  ___  ___

**Try This**

**4.** Jumps: _____

```
  4.568                          31.976
```
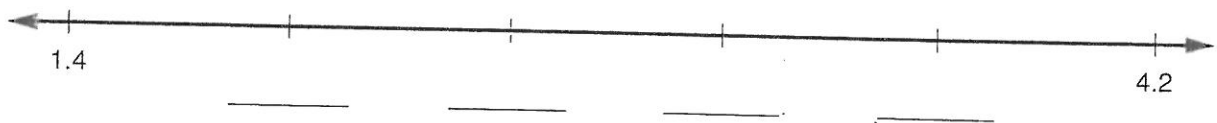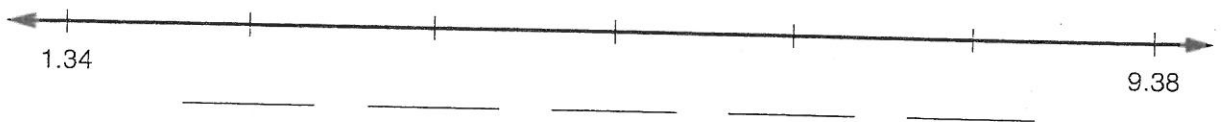
**LESSON 2·5**

# Interpreting Data

1. Organize the median reaction times for right and left hands for your class by gender—one set of data for girls and one set of data for boys.
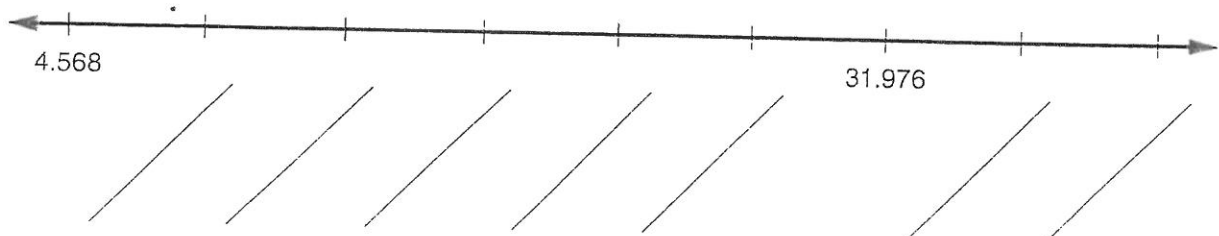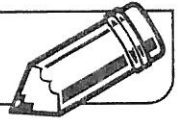
| Data Landmarks | Girls | Boys |
|---|---|---|
| Minimum | | |
| Maximum | | |
| Range | | |
| Mode | | |
| Median | | |
| Mean | | |

Use the questions below to interpret the data. Write your answers on a separate sheet of paper.

2. **a.** Who has the faster reaction times, boys or girls? _____

   **b.** Which landmark did you use to decide? _____ **c.** Why?

3. **a.** Suppose you put names in a hat and, without looking, pulled the name of one boy and one girl. How would you use the data from your class to predict who would be faster?

   **b.** Which landmark would you use to decide? _____ **c.** Why?

4. **a.** What true statements can you make about the data?

   **b.** How might these statements, called findings, be used by your class?

   **c.** Could your findings have importance to activities outside of school?

   **d.** What kind of picture or graph would help people understand your findings?
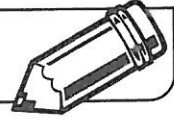
**LESSON 2·6** | **Order Fractions, Decimals, Percents**
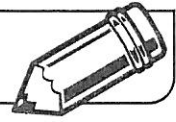
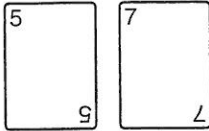Cut out the cards and order them from smallest to largest.

Use the table in the front of the journal to help you.

| $\frac{1}{2}$ | $33\frac{1}{3}\%$ | 0.25 | $\frac{3}{4}$ |
| 20% | 0.60 | $\frac{4}{5}$ | 0.10 |
| 30% | 0.70 | $\frac{9}{10}$ | $12\frac{1}{2}\%$ |
| 0.625 | $87\frac{1}{2}\%$ | $\frac{2}{3}$ | $16\frac{2}{3}\%$ |

## LESSON 2·7 | Extended Facts

### Directions

◆ Shuffle the deck and draw two cards.

◆ Record and multiply the numbers shown on the cards.

◆ Then use your solution to write extended facts.

Example:

[5]  [7]

$5 * 7 = 35$
$35 * 10 = 350$
$35 * 100 = 3,500$
$35 * 1,000 = 35,000$

1. _____ * _____ = _____

   _____ * 10 = _____

   _____ * 100 = _____

   _____ * 1000 = _____

2. _____ * _____ = _____

   _____ * 10 = _____

   _____ * 100 = _____
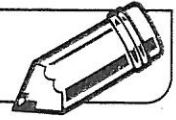
   _____ * 1000 = _____

3. _____ * _____ = _____

   _____ * 10 = _____

   _____ * 100 = _____

   _____ * 1000 = _____

4. Explain how you use multiplication facts to help you solve problems with larger numbers.

   _____

   _____

   _____

## LESSON 2·8 — A Mental Calculation Strategy

When you multiply a number that ends in 9, you can simplify the calculation by changing it into an easier problem. Then adjust the result.

**Example 1:** $2 * 99 = ?$

◆ Change $2 * 99$ into $2 * 100$.

◆ Find the answer: $2 * 100 = 200$

◆ Ask: *How is the answer to $2 * 100$ different from the answer to $2 * 99$?*
100 is 1 more than 99, and you multiplied by 2.
So 200 is 2 more than the answer to $2 * 99$.

◆ Adjust the answer to $2 * 100$ to find the answer to $2 * 99$:
$200 - 2 = 198$. So $2 * 99 = 198$.

**Example 2:** $3 * 149 = ?$

◆ Change $3 * 149$ into $3 * 150$.

◆ Find the answer: $3 * 150 = (3 * 100) + (3 * 50) = 450$.

◆ Ask: *How is the answer to $3 * 150$ different from the answer to $3 * 149$?*
150 is 1 more than 149, and you multiplied by 3.
So 450 is 3 more than the answer to $3 * 149$.

◆ Adjust: $450 - 3 = 447$. So $3 * 149 = 447$.

Use this strategy to calculate these products mentally.

1. $5 * 49$ _____
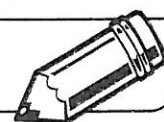
2. $5 * 99$ _____

3. $8 * 99$ _____

4. $4 * 199$ _____

5. $2 * 119$ _____

6. $3 * 98$ _____

## LESSON 2·9 | An Ancient Multiplication Method

Over 4,000 years ago, the Egyptians developed one of the earliest multiplication methods. This method, with some modifications, was then used by the ancient Greeks, and in the Middle Ages, by people living in other parts of Europe.

Study the examples of the Egyptian method below. Each problem has been solved by this method of multiplication. Try to figure out how the method works.

| 13 * 25 = _325_ | 18 * 17 = _306_ | 26 * 31 = _806_ |
|---|---|---|
| ✓ 1   25  (1 * 25) | ~~1   17~~ | ~~1   31~~ |
| ~~2   50  (2 * 25)~~ | ✓ 2   34 | ✓ 2   62 |
| ✓ 4   100  (4 * 25) | ~~4   68~~ | ~~4   124~~ |
| ✓ 8   200  (8 * 25) | ~~8   136~~ | ✓ 8   248 |
|    325  (13 * 25) | ✓ 16  272 | ✓ 16  496 |
| |    306 |    806 |

Make up a multiplication problem. Solve it using the Egyptian method. Then explain how the method works, using your problem as an example.

_____

_____

_____

_____

_____

_____

_____

_____

## LESSON 2·10 — Number Stories and Estimation
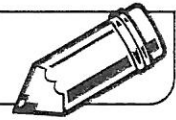
- ◆ Read each number story carefully.
- ◆ Write an open number sentence to use in estimating.
- ◆ Answer the question.

**Example:**

It is said that the Aztec king, Montezuma, drank about 50 cups of chocolate per day. Did he drink *more* or *less* than 10 gallons of chocolate in a week? (Hint: 16 cups = 1 gallon)

Open number sentence: $10 * 16 = $ Number of cups in 10 gallons

Answer: _more_

1. Certain varieties of seahorses can move 10.5 inches per minute. At this rate, could these seahorses be able to travel 6 yards in 1 hour?

   **a.** Open number sentence: _____

   **b.** Answer: _____

2. Orville Wright completed the first airplane flight on December 17, 1903. He traveled 120 feet in 12 seconds. If he had been able to stay in the air for a full minute, would he have traveled 1 mile? (Hint: 1 mile = 5,280 feet)

   **a.** Open number sentence: _____

   **b.** Answer: _____

3. In 1960, the Triton became the first submarine to circumnavigate the world. It covered 36,014 miles in 76 days. Is that more or less than 100 miles per day?

   **a.** Open number sentence: _____

   **b.** Answer: _____

Source: *The Kids' World Almanac of Records and Facts*