Classroom Cases:  
Fifth Grade 6 of 6

Brought to you by Kathy Cox, State Superintendent of Schools

A mathematics resource for parents, teachers, and students

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Going to the Movies!

When taking the family to the movies, calculate the cost by creating an algebraic equation. For example: three children and, two adults go to a movie. The price of a ticket for a child is $6.25; an adult ticket is $7.25. 

(3 × 6.25) + (2 × 7.25) = y.

Marble Patterns

Using marbles, create a pattern such as the one below. Make a chart to record the number of marbles in each step. Analyze the chart to find a pattern, and predict the number of marbles in the next 3 steps.

![Marble Pattern Image]

Further investigations:

Algebra

Students will:

- Represent mathematical relationships between quantities using mathematical expressions in problem-solving situations
- Apply patterns and rules to describe relationships and solve problems
- Represent unknowns using symbols, such as □ and △
- Write and evaluate mathematical expressions using symbols and letters

Classroom Cases:

1. Solve the following exercises for the unknown quantities:
   
a. 5 + n = 17  
   Case Closed - Evidence: a. n = 12

b. 53 - x = 33  
b. x = 20

c. □ + 19 = 20  
c. □ = 1

d. 4a = 32  
d. a = 8

e. \(\frac{35}{b} = 7\)  
e. b = 5

2. Find the rule used to make the table below. Fill in rows 4 - 8 using that rule, and in the last 4 rows, make up your own input and the corresponding output:

<table>
<thead>
<tr>
<th>IN</th>
<th>OUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>11</td>
<td>44</td>
</tr>
<tr>
<td>30</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>100</td>
<td>400</td>
</tr>
</tbody>
</table>

   Case Closed - Evidence:  
   Rule: In \(x\) \(\times 4\) = Out; or multiply input by 4 to get output

3. Solve the following word problem by writing and solving an algebraic equation. Use variables to represent the unknown numbers. Josh spent $28 on four gifts for his friends. How much money did each gift cost if they all cost the same amount?

Case Closed - Evidence:

\[4x = 28\]

\[x = 7\]  

Each gift cost $7.00.

Clues:

Symbols are often misinterpreted by students. The letters, symbols, or pictures used to represent numbers can change from problem to problem. For example, in the two problems \(x + 4 = 10\) and \(x + 9 = 42\), the value for the letter \(x\) is not the same. In the first problem, \(x = 6\). In the second problem, \(x = 33\). Sometimes letters and/or numbers are placed side by side, as in the equation \(2a = 10\). Here we use \(2a\) to represent \(2 \times a\).

Book’em:

- Safari Park by Stuart J. Murphy
- Two of Everything by Lily Toy Hong
- Anno’s Mysterious Multiplying Jar and Anno’s Magic Seeds by Mitsumasa Anno
- One Grain of Rice: a Mathematical Folktale by H. E. Demi

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