Linear Models

1. A store is offering a 15% discount on all items.
   a. Write a linear equation giving the sale price $S$ for an item with a list price $L$.
   b. Find the sale price of an item originally priced at $39.

2. A manufacturer pays its assembly line workers $11.50 per hour. In addition, workers receive a piecework rate of $0.75 per unit produced.
   a. Write a linear equation for the hourly wages $W$ in terms of the number of units $x$ produced per hour.
   b. Find the wages of a worker who works a 40-hour week and produces 350 units.

3. A contractor purchases a piece of equipment for $36,500. The operating cost is $5.25 per hour for fuel and maintenance, and the operator is paid $11.50 per hour.
   a. Write an equation giving the cost $C$ of operating the equipment for $t$ hours.
       (Include the purchase cost.)
   b. If customers are charged $27 per hour, write an equation for the revenue $R$ derived from $t$ hours of use.
   c. Write an equation for the profit $P$ derived from $t$ hours of use.
   d. Use the result of part (c) to find the number of hours this equipment must be used to break even.

4. On a yardstick, you notice that 13 inches is the same length as 33 centimeters.
   a. Use this information to find a mathematical model that related centimeters to inches.
   b. Use the model to complete the table.

<table>
<thead>
<tr>
<th>Inches</th>
<th>5</th>
<th>10</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centimeters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. An item that sells for $145.99 has a sales tax of $10.22.
   a. Find a mathematical model that gives the amount of sales tax $y$ in terms of the retail price $x$.
   b. Use the model to find the sales tax on a purchase that has a retail price of $540.50.