Math 111  
Group Activity: Percent and Proportionate Change

Suppose you are awarded a 5% raise in your salary. We call 5% the **percentage change** (or just **percent change**) in your salary and that percentage expressed as a decimal, 0.05, the **proportionate change**. To compute your NEW salary, add your OLD salary to the dollar amount of the raise, which is 5% of your OLD salary:

\[ \text{NEW} = \text{OLD} + 0.05 \cdot \text{OLD}. \]

1. If your current annual salary is $38,000, what is your salary after a 5% raise?

2. You inherit a diamond ring appraised at $5000. Diamonds are expected to appreciate by 8% per year. What would you expect the ring to be worth in one year?

3. You plan to buy a TV that is regularly priced at $450. The store is offering 25% off every product in the store. What is the sale price of the TV? (HINT: You can still use an equation similar to the salary equation. But, since this is a reduction in the cost of the TV, your proportionate change is *negative*.)

4. In general, if a quantity changes by \( p \times 100\% \) from an OLD value to a NEW value,

\[ \text{NEW} = \text{OLD} + p \cdot \text{OLD}. \]

Solve this equation for the proportionate change, \( p \).
5. Use either the formula, \( \text{NEW} = \text{OLD} + p \cdot \text{OLD} \) or the formula you found in #4 to answer the following questions.

(a) The population of a town was 4000 people in 2010 and 4093 in 2012. What was the percentage change in the population?

(b) A pair of shoes that regularly costs $103 is on sale for $60. What percent savings is this? (Again, your proportionate change will be negative.)

(c) A business purchased for $650,000 in 1994 sold for $850,000 in 1997. What was the percent change in its value?

(d) A collectible lunchbox increases in value by 1.4\% per year. If it is worth $507 one year from now, what is its value today?

(e) You start a new job with a starting salary of $40,000 and a 2\% cost-of-living raise each year. Fill in the following table:

<table>
<thead>
<tr>
<th>( t ) (in years)</th>
<th>salary after ( t ) years</th>
<th>dollar amount of raise</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$40,000</td>
<td>$40,000 \cdot 0.02 = $800</td>
</tr>
<tr>
<td>1</td>
<td>$40,800</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td></td>
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</tbody>
</table>

Is it true that a salary that increases by 2\% per year increases by 8\% in four years? Explain.