MA111 — Homework #7 Short Solutions

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1. (a) 5.2%
   (b) 4.7%
   (c) 9%
   (d) 4.825%
   (e) 19%
   (f) 8.74%
   (g) 35.6%
   (h) 3.89%

2. (a) 12%
   (b) 2814
   (c) 31.25
   (d) 80
   (e) 666.67%
   (f) 6000
   (g) 95357.44
   (h) 8.33%
   (i) 2

3. 360

5. 19,469,475

6. (a) 159.7%
   (b) 62.6%
   (c) 59.7%

7. 20%

9. 500

10. $3.51

2. Case Study 2.1
1. **Massery**: $6 per thousand and $3.77 per thousand.

   **Pierce**: $1 per $6 and $1 per $3.7.

   **Stilley** does not state the rates.

   **Basinger**: $166.67 per $1000 and $265 per $1000.

   **McGuire** re-computes the taxes and states the rates of his computed taxes ($3,754 on $30,000 and $56,748 on $200,000) as $125 per $1,000 and $284 per $1,000.

   **Herrington**: $166.67 per $1,000 and $265 per $1,000. **Herrington**: 16.7 percent and 26.5 percent.

   **VanHook**: 16.67 percent and 26.5 percent. **VanHook** restates Massery’s $6 per $1,000 as .06 percent.

2 and 4. We will compute the tax rates:

   $5000 in taxes on $30,000 income:
   
   \[
   \frac{5000}{30000} \approx 0.16667 \approx 16.7\%.
   \]

   $53,000 in taxes on $200,000 income:
   
   \[
   \frac{53000}{200000} = 0.265 = 26.5\%.
   \]

   So Herrington and VanHook are correct in stating the percentages.

   Now convert these tax rates to an amount per thousand dollars:

   $5000 in taxes on $30,000 income:
   
   \[
   0.1667 = \frac{x}{1000}
   \]

   \[
   0.1667 \cdot 1000 = 166.67 = x.
   \]

   So this tax rate is equivalent to $166.67 per $1000.

   $53,000 in taxes on $200,000 income:
   
   \[
   0.265 = \frac{x}{1000}
   \]

   \[
   265 = \frac{x}{1000}.
   \]

   So this tax rate is equivalent to $265 per $1000.
Massery is incorrect. Basinger and Herrington are correct.
To see that Pierce is correct, we compute:
For $5000 in taxes on $30,000 income:
\[
\frac{5000}{30000} = \frac{1}{x} \\
5000 \cdot x = 30000 \\
x = 6.
\]
For $53,000 in taxes on $200,000 income:
\[
\frac{53000}{200000} = \frac{1}{x} \\
53000 \cdot x = 200000 \\
x = 3.77.
\]
VanHook restates Massery’s $6 per $1,000 as 0.06 percent, and then says that at 0.06%, he should have paid $150 on $30,000 income.
Let’s check:
\[
\frac{6}{1000} = \frac{P}{100} \\
6 \cdot 100 = P \cdot 1000 \\
0.6 = P
\]
The actual rate would be 0.6%.
At this rate, what amount would be paid on $30,000?
\[
$30000 \cdot \frac{0.6}{100} = $180.
\]
3. As Pierce points out, it is likely that Massery’s “numerators and denominators are mixed up.” Note that \(\frac{30000}{5000} = 6\) and \(\frac{200000}{53000} = 3.77\).

3. Case Study 2

3. From the article: “…$1 billion per month… it’s only about half of 1 percent of the federal budget.” This implies that $12 billion per year is 0.5% of the federal budget. Let \(F\) be the amount of the federal budget. Then
\[
\frac{0.5}{100} = \frac{$12 billion}{F}.
\]
So \(F = \frac{100 \times $12 billion}{0.5} = $2400\) billion, which is $2.4 trillion.
4. From the article: “...create 170,000 jobs next year. That would add...0.13 percent to employment in this country. Let \( E \) be the number of people employed.

\[
\frac{0.13}{100} = \frac{170000}{E},
\]

so \( E = \frac{100 \times 170000}{0.13} = 130,769,230 \) or about 131 million.

4. Salary decrease and increase.

You are making $12 an hour. Due to the recession, your boss cuts your pay by 10%. One year later things are picking up, and your boss says he is now going to increase your salary by 10%. Will you be making $12 an hour again?

Answer: When your pay is cut by 10%, your new pay is $12 \( (1 - \frac{10}{100}) \) or $10.80 per hour. When your pay is then increased by 10%, your new pay is $10.80 \( (1 + \frac{10}{100}) \) or $11.88 per hour, which is not back to $12 per hour.