

Orienting Yourself to Section 7-2: Modeling Tax Schedules

The IRS has used the same tax schedule format for decades. About ten years ago, they added a tax worksheet that would make it easier to compute your tax. The computation was easier, but the worksheet “hides” the flavor of the tax schedule. It buries the delineations between tax brackets and the progressive rates. Nevertheless, the public finds it easier to work with.

In Section 7-2, students learn how the tax worksheet can be derived from the tax schedules. Here is the most recent tax schedule for single taxpayers:

2011 Tax Rate Schedules



The Tax Rate Schedules are shown to all levels of taxable income. Do see the instructions for line 44.

Schedule X—If your filing status is Single

| If your taxable income is: | | The tax is: | |
|----------------------------|---------------|------------------|---------------------|
| Over— | But not over— | | of the amount over— |
| \$0 | \$8,500 | 10% | \$0 |
| 8,500 | 34,500 | \$850.00 + 15% | 8,500 |
| 34,500 | 83,600 | 4,750.00 + 25% | 34,500 |
| 83,600 | 174,400 | 17,025.00 + 28% | 83,600 |
| 174,400 | 379,150 | 42,449.00 + 33% | 174,400 |
| 379,150 | | 110,016.50 + 35% | 379,150 |

Keep in mind that if your tax is under \$100,000, you can use the tax tables, in which the tax is already computed. That is why some of the lines from the tax schedule will not appear on the tax worksheet.

Section 7-2 of *Financial Algebra: Advanced Algebra with Financial Applications* approaches this task in graduated steps. The first step is to express the domain of taxable income using compound inequality notation. For example, if x is your taxable income, saying your taxable income is “**over \$174,400 but not over \$379,150**” can be written as the following compound inequality:

$$174400 < x \leq 379150.$$

Notice the deliberate use of the different inequality symbols. This is a great discussion point.

Express the taxable income domains for the six lines of the schedule:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Next, the students need to make literal equations out of the IRS instructions for computing the tax within each subset of the domain. Let's look at the tax for incomes over \$174,400 but not over \$379,150.

“The tax is \$42,449 plus 33% of the amount over \$174,400.”

This phrase needs to be translated into an algebraic expression. In *Financial Algebra: Advanced Algebra with Financial Applications* students covert verbal scenarios into algebraic expressions routinely; this important concept is not relegated to a two-week word problem unit.

If $t(x)$ is the tax function, notice that:

$$t(x) = .33(x - 174400) + 42449$$

On the next page, find this tax function for all six lines of the tax schedule. The schedule is reprinted so it is in view.

Schedule X—If your filing status is Single

| If your taxable income is: | | The tax is: | |
|----------------------------|---------------|------------------|---------------------|
| Over— | But not over— | | of the amount over— |
| \$0 | \$8,500 | 10% | \$0 |
| 8,500 | 34,500 | \$850.00 + 15% | 8,500 |
| 34,500 | 83,600 | 4,750.00 + 25% | 34,500 |
| 83,600 | 174,400 | 17,025.00 + 28% | 83,600 |
| 174,400 | 379,150 | 42,449.00 + 33% | 174,400 |
| 379,150 | | 110,016.50 + 35% | 379,150 |

$$t(x) = \left\{ \begin{array}{l} \text{_____} \\ \text{_____} \\ \text{_____} \\ \text{_____} \\ \text{.33}(x - 174400) + 42449 \\ \text{_____} \end{array} \right.$$

If you combine the work you have done on the domains and on the tax functions, you can see how the piecewise function for income tax was created.

$$t(x) = \begin{cases} .10x & \text{if } 0 < x \leq 8500 \\ .15(x - 8500) + 850 & \text{if } 8500 < x \leq 34500 \\ .25(x - 34500) + 4750 & \text{if } 34500 < x \leq 83600 \\ .28(x - 83600) + 17025 & \text{if } 83600 < x \leq 174400 \\ .33(x - 174400) + 42449 & \text{if } 174400 < x \leq 379150 \\ .35(x - 379150) + 110016.50 & \text{if } x > 379150 \end{cases}$$

The next step is to turn this equation into slope-intercept form, using the distributive property and then combining like terms. Let's look at the tax for incomes over \$174,400 but not over \$379,150.

$$t(x) = .33(x - 174400) + 42449$$

Change this into slope-intercept form.

Look for your answer on the tax worksheet shown below.

Section A—Use if your filing status is **Single**. Complete the row below that applies to you.

| Taxable income. If line 43 is— | (a) Enter the amount from line 43 | (b) Multiplication amount | (c) Multiply (a) by (b) | (d) Subtraction amount | Tax. Subtract (d) from (c). Enter the result here and on Form 1040, line 44 |
|--|---|---------------------------------|-------------------------------|------------------------------|--|
| At least \$100,000 but not over \$174,400 | \$ | × 28% (.28) | \$ | \$ 6,383.00 | \$ |
| Over \$174,400 but not over \$379,150 | \$ | × 33% (.33) | \$ | \$ 15,103.00 | \$ |
| Over \$379,150 | \$ | × 35% (.35) | \$ | \$22,686.00 | \$ |

Notice how the tax computation is more direct, but information that is quick to see on the tax schedules is not as apparent here.