Module 14: Student Activity

Income & Payroll Functions

Using functions, students will learn to calculate net income after taxes by inputting the gross income and tax rates. By understanding how to use functions, students can quickly and accurately determine net income for various income levels and tax brackets.

Part I: Marginal Tax Rate

As you've learned, the **marginal tax rate** is the tax rate you pay on the last dollar you earned. It depends on your taxable income; as you earn more money, you may pay a higher tax rate on those additional earnings. Here are the marginal tax rates for single individuals in 2022:

- 10% for incomes $11,000 or less
- 12% for incomes over $11,000
- 22% for incomes over $44,725
- 24% for incomes over $95,375
- 32% for incomes over $182,100
- 35% for incomes over $231,250
- 37% for incomes over $578,125

1. **Using the information above, complete the equation to represent the marginal tax rate as a function of taxable income (x).**

$$f(x) = \begin{cases} \_\_\_\_\_ & \_\_\_\_\_ \\ \_\_\_\_\_ & \_\_\_\_\_ \\ \_\_\_\_\_ & \_\_\_\_\_ \\ 24 & 95376 < x \leq 182100 \\ 32 & 182100 < x \leq 231251 \\ 35 & 231251 < x \leq 578125 \\ 37 & x > 578125 \end{cases}$$

2. **What is f(50000)? What does it represent in this context?**

3. **Sam's taxable income is $110,000. After looking at the tax brackets, they say: "Oh no- I'm in the 24% tax bracket? So that means I'll have to pay 24% of my income in taxes?! That's $26,400!" Is Sam correct? Why or why not?**

4. **Farrell works as an assistant earning $40,000 per year. He wants to accept another job offer for a similar position that pays $47,000 but he is thinking of turning it down because he can't afford to move into the 22% income tax bracket. What would you say to Farrell?**

Part II: Effective Tax Rate

$$\text{Effective Tax Rate} = \frac{\text{Taxes Paid}}{\text{Taxable Income}}$$

5. **Sam ended up paying $19,800 in total income taxes on their $110,000 in taxable income. What is their effective tax rate? Be sure to convert it from a decimal to a percent.**

6. **Why is their effective tax rate different from their marginal tax rate?**

7. **Complete the third column by writing expressions for the <u>total taxes paid</u>, as a function of taxable income, in each tax bracket.**

8. **The <u>effective tax rate</u> is the overall percentage of someone's income that they pay in taxes. Complete the table by writing expressions for the effective tax rate in each tax bracket.**

Domain (Tax Bracket)	Marginal Tax Rate	Equation for Total Taxes Paid	Equation for Effective Tax Rate
$0 < x \leq 11{,}000$	10%	**0.10x**	$\frac{0.10x}{x}$
$11{,}000 < x \leq 44{,}725$	12%	0.12(x - 11,000) + 0.10(11,000)= **0.12(x - 10,275) + 1,100**	$\frac{0.12\,(x - 11,000) + 1,100}{x}$
$44{,}725 < x \leq 95{,}375$	22%	0.22(x -44,725) + 1,100 + 0.12(44,7275-11000) = **0.22(x -41,775) + 5,147**	$\frac{0.22\,(x - 44,725) + 5147}{x}$
$95{,}375 < x \leq 182{,}100$	24%		
$182{,}100 < x \leq 231{,}250$	32%		
$231{,}250 < x \leq 578{,}125$	35%		
$x > 578{,}125$	37%		

9. **Why is the effective tax rate lower than the marginal tax rate?**