

Precalculus and Modeling

Federal Tax Brackets Activity

Every year, the IRS adjusts more than 40 tax provisions for inflation. This is done to prevent what is called “bracket creep.” This is the phenomenon by which people are pushed into higher income tax brackets or have reduced value from credits or deductions due to inflation, instead of any increase in real income.

The IRS uses the Consumer Price Index (CPI) to calculate the past year’s inflation and adjusts income thresholds, deduction amounts, and credit values accordingly.

from: <http://taxfoundation.org/article/2016-tax-brackets>

In 2017, the federal income tax brackets will be as follows:

2017 Taxable Income Brackets and Rates			
Rate	Single Filers	Married Joint Filers	Head of Household Filers
10%	\$0 to \$9,325	\$0 to \$18,650	\$0 to \$13,350
15%	\$9,325 to \$37,950	\$18,650 to \$75,900	\$13,350 to \$50,800
25%	\$37,950 to \$91,900	\$75,900 to \$153,100	\$50,800 to \$131,200
28%	\$91,900 to \$191,650	\$153,100 to \$233,350	\$131,200 to \$212,500
33%	\$191,650 to \$416,700	\$233,350 to \$416,700	\$212,500 to \$416,700
35%	\$416,700 to \$418,400	\$416,700 to \$470,700	\$416,700 to \$444,550
39.6%	\$418,400+	\$470,700+	\$444,550+

Source: IRS

Each bracket is associated with a marginal tax rate, that is, a rate that only applies to the money earned within that bracket. For example, if a single filer earns \$15,000 in the year 2017, dollars 0 to 9,325 will be taxed at a 10% rate, while dollars 9,325 to 15,000 will be taxed at a 15% rate.

1. Write a function $f_1(x)$ that takes in x , the total number of dollars a single filer earns in the year 2017 and outputs the amount of total taxes that person will pay if he/she earns \$9,325 or less.
2. Write a function $f_2(x)$ that takes in x , the total number of dollars a single filer earns in the year 2017 and outputs the amount of total taxes that person will pay if he/she earns between \$9,325 and \$37,950.

A **piecewise-defined function** is a function that is defined differently for different values of x . For example, the absolute value function can be written as a piecewise-defined function as follows:

$$g(x) = |x| = \begin{cases} -x, & x < 0 \\ x, & x \geq 0 \end{cases}$$

Notice the notation for writing a piecewise-defined function. You write the equation for each piece, as well as the domain on which you would use each piece.

3. Write a piecewise-defined function $f(x)$ that takes in x , the total number of dollars a single filer earns in the year 2017 and outputs the amount of total taxes that person will pay if he/she earns any amount of money. (Hint: You’ve already written two of the pieces in #1 and #2 of this handout.)