

Applications

EXAMPLE: If you were a single person in Connecticut in 2013 with a taxable income of x dollars and $x \leq \$500,000$ then your state income tax T was determined by the rule

$$T(x) = \begin{cases} .03x & \text{if } 0 \leq x \leq 10,000 \\ 300 + .05(x - 10,000) & \text{if } 10,000 \leq x \leq 500,000 \end{cases}$$

Find the income tax paid by a single person with the given taxable income. (Data from: www.tax.brackets.org.)

(a) \$9200

Solution: We must find $T(9200)$. Since 9200 is less than 10,000, the first part of the rule applies:

$$\begin{aligned} T(x) &= .03x \\ T(9200) &= .03(9200) = \$276 \end{aligned}$$

(b) \$30,000

Solution: Now we must find $T(30,000)$. Since 30,000 is greater than \$10,000, the second part of the rule applies:

$$\begin{aligned} T(x) &= 300 + .05(x - 10,000) \\ T(30,000) &= 300 + .05(30,000 - 10,000) \\ &= 300 + .05(20,000) \\ &= 300 + 1000 \\ &= \$1300 \end{aligned}$$