

Example 1

The sales tax rate in a city is 9.3%. How much sales tax will you pay on a \$140 purchase?

$$\begin{aligned} \$140 \cdot 0.093 &= \$13.02 \\ &\quad \begin{array}{l} 9.3\% \\ \text{is tax rate} \end{array} \end{aligned}$$

↑
tax

NYC Sales Tax Rate is 8.875%

↳ 4% (state)

4.875% (city)

If this \$140 item was bought in NYC.

$$\text{Tax} \quad \frac{8.875\%}{100\%} = 0.08875$$

$$\begin{aligned} \$140 \cdot 0.08875 &= \$12,425 \quad \begin{array}{l} \geq 5 \uparrow \\ < 5 \text{ stay} \end{array} \\ &= \$12,43 \end{aligned}$$

$$\begin{aligned} \text{Total:} \quad & \$140 + \$12.43 = \$152.43 \\ & \text{price} + \text{tax} \end{aligned}$$

$$\text{price} + \text{price} \cdot \text{tax rate}$$

$$\$140 + \$140 (0.08875)$$

$$\$140 (1 + 0.08875)$$

$$\$140 (1.08875) = \$12.425 \approx \$12.43$$

$$\text{price} * \left(1 + \frac{\text{tax rate}}{\text{(in decimal)}} \right)$$

Effective rate

The effective tax rate is the equivalent percent rate of the tax paid out of the dollar amount the tax is based on.

Example 2

Joan paid \$3,200 in property taxes on her house valued at \$215,000 last year. What is the effective tax rate?

↑
taxes

↑
value of the house

* to calculate tax...

$$\text{price} * (\text{tax rate}) = \text{tax}$$

$$(\$215000) * (\text{tax rate}) = \$3200$$

$$\frac{(\$215000) * (\text{tax rate})}{\$215000} = \frac{\$3200}{\$215000}$$

$$\text{tax rate} = \frac{32}{2150} \quad \leftarrow \text{fraction}$$

* acceptable to an extent
but we speak of tax rates
in percentages

$$\text{tax rate} = \frac{32}{2150} * 100 \approx 1.48\%$$

in percent

* Convert fraction to percent

→ convert to decimal to percent
divide numerator by denominator move decimal 2 →

→ multiply by 100

Tax categories

A **flat tax**, or proportional tax, charges a constant percentage rate.

A **progressive tax** increases the percent rate as the base amount increases.

A **regressive tax** decreases the percent rate as the base amount increases.

Example 3

The United States federal income tax on earned wages is an example of a progressive tax. People with a higher wage income pay a higher percent tax on their income.

For a single person in 2011, adjusted gross income (income after deductions) under \$8,500 was taxed at 10%. Income over \$8,500 but under \$34,500 was taxed at 15%.

e.g. 1 person made \$7000

→ 10% because \$7000 < \$8500

$$\begin{array}{ccc} 7000 & (0.10) & = & \$700 \\ \text{income} & \uparrow \text{tax rate} & & \text{taxed} \end{array}$$

John made \$30,000

if income is between

$0 \leq 8500 \rightarrow 10\%$

must pay 10%

$8500 < 34500 \rightarrow 15\%$

← remaining money 15%

↑
in this bracket

$$30000 = 8500 + 21,500$$

↑
taxed @ 10%
↑
remaining
in row +
taxed @ 15%

Interval of 2nd tax bracket

$$\begin{array}{r} 34,500 \\ - 8,500 \\ \hline 26,000 \end{array}$$

21,500 remaining < 26,000 length of tax bracket

$$\$8500 (10) + \$21,500 (0.15)$$

$$\$850 + \$3225 = \$4,075$$

taxes

Effective Tax Rate

$$\frac{\text{tax}}{\text{income}} \cdot 100 = \frac{4075}{30000} \times 100 = 13,58\bar{3}\%$$

$$\approx 13,58\%$$

$$\approx 13,6\%$$

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Income over \$34,500
under \$75,500 taxed at 20%

Abbey makes \$60,000 in 2011

	length	
8500-0	8500	10%
34500-8500	26000	15%
75,500-34500	41,000	20%

$$\begin{array}{r} \times 60000 \\ 34500 \\ \hline 25500 \end{array}$$

Abbey is here

$$8500 (.10) + 26,000 (.15) + 25,500 (.20)$$
$$= 850 + 3900 + 5100$$

$$= \$9,850 \text{ in taxes}$$

Example 4

A gasoline tax is a flat tax when considered in terms of consumption, a tax of, say, \$0.30 per gallon is proportional to the amount of gasoline purchased. Someone buying 10 gallons of gas at \$4 a gallon would pay \$3 in tax, which is $\$3/\$40 = 7.5\%$. Someone buying 30 gallons of gas at \$4 a gallon would pay \$9 in tax, which is $\$9/\$120 = 7.5\%$, the same effective rate.

However, in terms of income, a gasoline tax is often considered a regressive tax. It is likely that someone earning \$30,000 a year and someone earning \$60,000 a year will drive about the same amount. If both pay \$60 in gasoline taxes over a year, the person earning \$30,000 has paid 0.2% of their income, while the person earning \$60,000 has paid 0.1% of their income in gas taxes.