

COMPOUND INTEREST FORMULA FOR INTEREST PAID n TIMES PER YEAR

$$A = P \left(1 + \frac{\text{APR}}{n} \right)^{(nY)}$$

where

- A = accumulated balance after Y years
- P = starting principal
- APR = annual percentage rate (as a decimal)
- n = number of compounding periods per year
- Y = number of years

Note that Y is not necessarily an integer; for example, a calculation for three and a half years would have $Y = 3.5$.

SAVINGS PLAN FORMULA (REGULAR PAYMENTS)

$$A = \text{PMT} \times \frac{\left[\left(1 + \frac{\text{APR}}{n} \right)^{(nY)} - 1 \right]}{\left(\frac{\text{APR}}{n} \right)}$$

where

- A = accumulated savings plan balance
- PMT = regular payment (deposit) amount
- APR = annual percentage rate (as a decimal)
- n = number of payment periods per year
- Y = number of years

$$\text{PMT} = \frac{A \times \frac{\text{APR}}{n}}{\left[\left(1 + \frac{\text{APR}}{n} \right)^{(nY)} - 1 \right]}$$

As with compound interest, the accumulated balance (A) is often called the *future value* (FV); the *present value* is the starting principal (P), which is 0 because we assume the account has no balance before the payments begin.

TOTAL AND ANNUAL RETURN

Consider an investment that grows from an original principal P to a later accumulated balance A .

The total return is the relative change in the investment value:

$$\text{total return} = \frac{(A - P)}{P}$$

The annual return is the annual percentage yield (APY) that would give the same overall growth. The formula is

$$\text{annual return} = \left(\frac{A}{P} \right)^{(1/Y)} - 1$$

where Y is the investment period in years.

LOAN PAYMENT FORMULA (INSTALLMENT LOANS)

$$\text{PMT} = \frac{P \times \left(\frac{\text{APR}}{n} \right)}{\left[1 - \left(1 + \frac{\text{APR}}{n} \right)^{(-nY)} \right]}$$

where

- PMT = regular payment amount
- P = starting loan principal (amount borrowed)
- APR = annual percentage rate
- n = number of payment periods per year
- Y = loan term in years

TABLE 4.9 2009 Margin Tax Rates, Standard Deductions, and Exemptions

Tax Rate*	Single	Married Filing Jointly	Married Filing Separately	Head of Household
10%	up to \$8350	up to \$16,700	up to \$8350	up to \$11,950
15%	up to \$33,950	up to \$67,900	up to \$33,950	up to \$45,500
25%	up to \$82,250	up to \$137,050	up to \$68,525	up to \$117,450
28%	up to \$171,550	up to \$208,850	up to \$104,425	up to \$190,200
33%	up to \$372,950	up to \$372,950	up to \$186,475	up to \$372,950
35%	above \$372,950	above \$372,950	above \$186,475	above \$372,950
standard deduction	\$5700	\$11,400	\$5700	\$8350
exemption (per person)**	\$3650	\$3650	\$3650	\$3650

*Each higher marginal rate begins where the prior one leaves off. For example, for a single person, the 15% marginal rate affects income starting at \$8350, which is where the 10% rate leaves off, and continuing up to \$33,950.

FICA applies only to income from wages (including tips) and self-employment. It does not apply to income from such things as interest, dividends, or profits from sales of stock. In 2009, the FICA tax rates for individuals who were *not* self-employed were

- 7.65% on the first \$106,800 of income from wages
- 1.45% on any income from wages in excess of \$106,800

In addition, the individual's employer is required to pay matching amounts of FICA taxes.

Individuals who are self-employed must pay both the employee and the employer shares of FICA. That is, the rates for self-employed individuals are *double* the rates paid by individuals who are not self-employed.

FICA is calculated on *all* wages, tips, and self-employment income. You may not subtract any adjustments, exemptions, or deductions when calculating FICA taxes.

Tax credit per child: In 2009, there was a tax credit of up to \$1000 per child, in certain situations. Because these situations were not explained in the text, you are not expected to apply this tax credit when calculating taxes in any of the problems in this course.

Dividends and Capital Gains

Not all income is created equal, at least not in the eyes of the tax collector! In particular, dividends (on stocks) and capital gains—profits from the sale of stock or other property—get special tax treatment. Capital gains are divided into two subcategories. **Short-term capital gains** are profits on items sold within 12 months of their purchase, and **long-term capital gains** are profits on items held for more than 12 months before being sold.

Long-term capital gains and most dividends are taxed at lower rates than other income such as wages and interest earnings. As of 2009, the rates were

- 0% for income in the 10% and 15% tax brackets
- 15% for income in all higher tax brackets

In a few cases, capital gains get even better tax treatment. For example, capital gains on the sale of your home are often tax exempt. (There are also some special cases in which capital gains are taxed at higher rates.)