8.5 Annuities, Methods of Saving, and Investments

# Objective 1: Determine the value of an annuity

An **annuity** is a sequence of equal payments made at equal time periods. The **value of an annuity** is the sum of all deposits plus all interest paid.

**DETERMINING THE VALUE OF AN ANNUITY**

If *P* is the deposit made at the end of each compounding period for an annuity that pays an annual interest rate *r* compounded *n* times per year, the value, *A*, of the annuity after *t* years is

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If interest is compounded annually, then  and the formula simplifies to

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# Objective 2: Determine regular annuity payments needed to achieve a financial goal

The annuity formula can be used to determine the investment required to meet a financial goal. Solve the annuity formula for *P* to determine the amount of money that should be deposited at the end of each compounding period so that an annuity has a future value of *A* dollars.

**REGULAR PAYMENTS NEEDED TO ACHIEVE A FINANCIAL GOAL**

The deposit that must be made at the end of each compounding period into an annuity that pays an annual interest rate *r* compounded *n* times per year in order to achieve a value of *A* dollars after *t* years is

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# Objective 3: Understand stocks and bonds as investments

Bankdeposits are low risk **cash investments**. The account value up to $250,000 is insured by the federal government and the bank pays a published interest rate which guarantees a **return** on the investment. Investments such as stocks and bonds may have higher returns but they are also riskier. **Risk** is the chance that the principal will decrease or be lost. **Return** is the interest, dividend, or increased value earned on the investment and is usually expressed as a percent of the starting value.

**STOCKS AND BONDS VOCABULARY**

**Stock –** A share of ownership in the company sold to an investor. The selling price fluctuates with supply and demand. Selling a stock that has gone up (down) in value results in a **capital gain (loss)** for the **shareholder**. Shareholders also make money when the company pays a per-share **dividend**, or portion of company profits.

**Bond –** A loan to a company (or government entity) made by an investor. The initial price is the **face value** of the bond which will be paid back with interest. Like stocks, bonds can be traded or sold among investors and may vary in **value**. Therefore, there is a risk that is less than that of stocks, but greater than that of bank deposits.

**Mutual Fund –** A collection of stocks and bonds managed by a **fund manager**. Purchasing shares of a mutual fund allows the investor to own an assortment of higher and lower risk investments, a **diversified portfolio**, without having to keep track of them individually.

# Objective 4: Read stock tables

Daily newspapers and online services give current stock prices and other information about stocks. The sample below is a listing for Federal Express, represented by the symbol FDX.

| **52- Week High** | **52-Week Low** | **Stock** | **SYM** | **Div** | **Yld %** | **PE** | **Vol**  **100s** | **Hi** | **Lo** | **Close** | **Net Chg** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 99.46 | 34.02 | FedEx | FDX | .44 | 1.0 | 19 | 37701 | 45 | 43.47 | 44.08 | -1.60 |

In addition to the 52-week high and low prices, the listing gives yesterday’s high and low prices, and the price when the stock exchange **closed** yesterday. The **net change** is the difference between the closing price yesterday and the closing price one day prior. A negative net change means the stock lost value yesterday. **Volume** is the number of shares traded yesterday, expressed in hundreds.

The **yield percent** is the ratio of the **dividend per share** to the closing price. This represents income that accrues while the stock is being held, but not sold. Note that not all companies pay dividends.

**PE ratio** or price-to-earnings ratio is a number that compares the price of stock with the company’s profitability. The annual earnings, or profit, of the company is divided by the total number of shares of stocks, to get **annual earnings per share**. This is divided into the price to get the PE ratio. Since PE ratio is the published number, the equation can be manipulated to calculate the annual earnings per share.



**Objective 5: Understand accounts designed for retirement savings**

Accounts designed for retirement savings differ from ordinary savings accounts in that there are tax or employer benefits associated with the deposits and/or earnings, and there is usually a penalty for withdrawing money from the accounts before age 59 ½.

Deposits to a traditional **individual retirement account**, or **IRA**, are not taxed. They are a deduction when calculating income taxes. Withdrawals from a traditional IRA are taxed. In contrast, deposits to a **Roth IRA** are taxed as part of income. Withdrawals, including all of the earned interest, are tax free. Some employers provide incentives for their employees to save towards retirement by making contributions to **employer-sponsored retirement plans** on behalf of the employee.