Investor Professor
An educational review of basic investment concepts and techniques—in easy-to-understand terms.

Five Key Financial Concepts

There are five concepts researchers view as being key for determining whether a person is financially literate or lacks adequate knowledge to make the best decisions.

The first three are doing a simple interest rate calculation, factoring the impact of inflation into a scenario and exhibiting an understanding of risk diversification ("Financial Literacy and Retirement Planning in the United States," Annamaria Lusardi and Olivia S. Mitchell, NBER, 2011). The next two concepts, added after the initial three concepts were widely used in financial literacy testing, analyze a person's understanding of the tax implications of contributions to retirement savings and how employee matching affects contributions ("Can Simple Informational Nudges Increase Employee Participation in a 401(k) Plan?," Robert Clark, Jennifer A. Maki and Melinda Sandler Morrill, NBER, 2013.)

The first three concepts are considered by researchers to be so important for making good financial decisions that they have been dubbed "The Big Three." The second two are considered important given the wide use of defined-contribution plans such as 401(k) plans and the responsibility of employees to effectively manage their retirement savings.

Studies have found a link between higher scores on financial literacy quizzes and investment returns. A study published in 2014 surveyed 22,000 employees of a large financial institution. Researchers Lusardi, Mitchell and Clark found that knowledge of financial concepts enhances risk-adjusted returns by at least 1.3 percentage points annually. Over a 30-year investment span, the improved portfolio performance leads to 25% greater wealth ("Investment Knowledge Boosts Portfolio Returns," June 2014 *AAII Journal* Briefly Noted). A later study of Federal Reserve employees found that the most knowledgeable employees averaged eight basis points (0.08%) per month more (nearly 1% annually) in expected excess return ("Financial Literacy Tied to Greater Retirement Savings," August 2015 *AAII Journal* Briefly Noted).

The questions used to test on these five concepts, as written in the aforementioned research papers, are listed here, followed by an answer key and discussion as to the rationale behind each correct answer. Before reading the answers, take the quiz. For those who are curious, the average surveyed financial institution and Federal Reserve employee, respectively, answered 3.7 and 3.8 of the five questions correctly.

The Financial Literacy Quiz

Question 1: Suppose you had $100 in a savings account and the interest rate was 2% per year. After five years, how much do you think you would have in the account if you left the money to grow?

- *More than $110*
- *Exactly $110*
- *Less than $110*
- *Do not know*

Question 2: Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account?

- *More than today*
- *Exactly the same*
- *Less than today*
- *Do not know*

Question 3: True or false? Buying a single company's stock usually provides a safer return than investing in a stock mutual fund.

- *True*
- *False*
- *Do not know*

Question 4: Assume you were in the 25% tax bracket (you pay $0.25 in tax for each dollar earned) and you contributed $100 pretax to an employer's 401(k) plan. Your take-home pay (what's in your paycheck after all taxes and other payments are taken out) will then:

- *Decline by $100*
- *Decline by $75*
- *Decline by $50*
- *Remain the same*
- *Do not know*

Question 5: Assume that an employer matched employee contributions to a retirement plan dollar for dollar. If the employee contributed $100 to the 401(k) plan, his account balance in the plan including his contribution would:

- *Increase by $50*
- *Increase by $100*
- *Increase by $200*
- *Remain the same*
- *Do not know*

The Answers

Here are the correct answers and explanations as to why they are correct.

Question 1: Interest Rates and Compounding

Due to the power of compounding, the account's balance would exceed $110. At the end of the first year, assuming interest is paid annually on year-end balances, the 2% interest rate will have increased the account's balance to $102.00 ($100.00 starting balance + 2%, or $2.00, interest on the balance of $100.00). At the end of Year 2, the balance will have grown to $104.04 ($102.00 balance from the end of Year 1 + 2%, or $2.04, interest on $102.00). At the end of Year 3, the account will have grown to $106.12 thanks to the growing balance ($104.04 balance from the end of Year 2 + 2%, or $2.08, interest on $104.04). If no funds are withdrawn and the interest rate remains unchanged, the balance will grow to $110.41 by the end of Year 5.

Simply multiplying the interest rate of 2% by the number of periods (five years) would have equated to an ending balance of $110. This answer ignores the influence of compounding, which generates earnings from previous earnings. As the account balance grows, the absolute dollar amount earned increases as well, even if the interest rate (or percentage rate of return) does not change.

Question 2: The Effect of Inflation

You would be able to buy less. A person's ability to buy goods and services ("purchasing power") would be diminished because the rate of inflation is greater than the rate of return (2% versus 1%). The question tests not only knowledge of inflation, but also the concept of real return. If returns do not exceed inflation, a person's purchasing power is reduced even if the account balance rises in absolute terms. Real returns are a key reason why investors are encouraged to maintain an allocation to equities even while in retirement.

Question 3: Diversification

The statement is false; a single stock portfolio does not provide a safer return than a stock mutual fund. Holding a single stock exposes the investor to the specific risks of that one company (also referred to as idiosyncratic risk). Conversely, a mutual fund owns many stocks, which reduces the impact that any one single stock can have on the overall portfolio. For example, in a single stock portfolio, were the stock's price to suddenly drop due to a company-specific event (e.g., worse-than-expected sales or earnings, the loss of a key customer, the sudden resignation of a key executive, etc.) the portfolio would decline by the same amount. By owning multiple stocks, a mutual fund diversifies against the idiosyncratic risk inherent in any one single stock.

Question 4: Tax Implications of 401(k) Plan Contributions

A $100 contribution to a traditional 401(k) plan reduces take-home pay by $75. The $100 contribution made by the employee reduced taxable income dollar-for-dollar ($100 in this case). As such, the employee's tax liability was reduced by $25 (marginal tax rate of 25% × $100 reduction in taxable income). Adjusting the $100 contribution by the $25 reduction in tax withholding decreases take-home pay by $75. Put another way, by making the $100 contribution to the retirement savings plan, the employee's tax withholdings are reduced by $25. This tax incentive partially offsets the impact of the contribution on take-home pay.

Contributions to traditional individual retirement accounts (IRAs) have the same impact on taxes. They reduce the full-year tax liability up to limits specified in the tax code.

Contributions to Roth 401(k) plans and Roth IRAs do not have the same immediate tax benefit. The tax liability for the current tax year is unaffected. (A contribution to a Roth 401(k) plan reduces take-home pay dollar-for-dollar.) The tax benefit, rather, is realized when the employee begins to take withdrawals in retirement. Withdrawals from Roth accounts are not taxed, whereas withdrawals from 401(k) plans and traditional IRAs are taxed at ordinary income rates, assuming withdrawals are not made prematurely.

Question 5: Employer Matching Contributions

A $100 contribution by an employee will increase the retirement account balance by $200 when the employer match is 100%. In this particular scenario, employee contributions are matched dollar-for-dollar. Since the employee is contributing $100 and the match percentage is 100%, the account balance rises by $200 ($100 employee contribution + employer match of $100.) If the match had been 50%, the account balance would have risen by $150 ($100 contribution + $50 employer match, or 50% × $100).

Matching contributions made to a traditional 401(k) plan are not taxable. Therefore, neither the employee's take-home pay nor tax liability is impacted. This factor makes maximizing the employer match very important. Failing to do so means not taking advantage of the full compensation package offered by your employer. Missing out on the full employer match also diminishes your long-term wealth since the there is a smaller balance on which to realize compound returns (see the answer for Question 1).

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Charles Rotblut contributed to this article.