



# Calculating Stock Returns

[Solutions]

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1. Return refers to the amount of money you make from an investment, expressed in dollar terms.
  - a. True
  - b. False**

*Return refers to the amount of money you make from an investment, expressed in percentage terms. Profit expresses the same information in dollar terms.*
  
2. Which ONE of the following is the correct formula for the return on a stock?
  - a.  $r = P_t/P_{t+1} - 1$
  - b.  $r = P_{t+1}/P_t - 1$**
  - c.  $r = (P_t - P_{t+1})/P_t$
  - d.  $r = (P_t - P_{t+1})/P_t - 1$
  - e.  $r = 1 + P_{t+1}/P_t$
  
3. How much money would you make if you bought 10 shares of Alphabet (formerly, Google) for \$942.56 each and sold them for \$1,219.74 each? Ignore transaction costs and taxes for simplicity.
  - a. \$277.15
  - b. \$2,771.80**
  - c. \$1,578.43
  - d. \$3,254.52
  - e. None of the above.

***Solution:***

Profit = Selling Price – Purchase Price

Total Profit = (Selling Price – Purchase Price) x Number of Shares

Total Profit = (\$1,219.74 – \$942.56) x 10

Total Profit = \$2,771.80

4. Imagine you bought 100 shares of Tesla (TSLA) at \$150.43 each and sold your entire holding for \$229.77 per share. What is your return?
- 74.39%
  - 63.97%
  - 52.74%**
  - \$22,826.57
  - \$79.34

**Solution:**

$$r_{TSLA} = \frac{P_{t+1} - P_t}{P_t} \equiv \frac{P_{t+1}}{P_t} - 1$$

$$r_{TSLA} = \frac{\$229.77}{\$150.43} - 1$$

$$r_{TSLA} \approx 0.5274 = 52.74\%$$

5. What is the return for a stock that was bought for €47.39 and sold for €38.59?
- 22.80%
  - 17.53%
  - 12.49%
  - 3.82%
  - 18.57%**

**Solution:**

$$r_j = \frac{P_{t+1}}{P_t} - 1$$

$$r_j = \frac{\text{€}38.59}{\text{€}47.39} - 1$$

$$r_j \approx -0.1857 = -18.57\%$$

6. Calculate the return for a stock that earned a £27 profit per share based on a sale price of £104 per share.
- 385.19%
  - 100%
  - 38.52%
  - 35.06%**
  - 3.19%

**Solution:**

In this question, we only know the sale price ( $P_{t+1}$ ) and the profit per share ( $P_{t+1} - P_t$ ), meaning we need to work out the purchase price ( $P_t$ ) as:

$$\text{Profit} = P_{t+1} - P_t$$

$$£27 = £104 - P_t$$

$$P_t = £104 - £27$$

$$P_t = £77$$

$$r_j = \frac{P_{t+1}}{P_t} - 1$$

$$r_j = \frac{£104}{£77} - 1$$

$$r_j \approx 0.3506 = 35.06\%$$

7. Consider the following. An investor buys 100 shares of Alibaba (BABA) for \$58.97 each. She sold half her holdings for \$87.81 and continues to hold the other half at \$184.82. What was the return on the stocks she sold, and what was her profit?
- 213.41% return and \$12,585 profit.
  - 213.41% return and \$6,292.50 profit.
  - 110.48% return and \$4,850.50 profit.
  - 51.59% return and \$2,884 profit.
  - 48.91% return and \$1,442 profit.**

**Solution (Question 7):**

Essentially, we're dealing with just half the holdings of this investor.

To make our lives easier, we can work with 50 shares (instead of 100 shares) right from the word go.

That's because the question focuses on the profit and return on the shares *she sold*, not what she continues to hold.

Profit = Selling Price – Purchase Price

Total Profit = (Selling Price – Purchase Price) x Number of Shares

Total Profit = (\$87.81 – \$58.97) x 50

Total Profit = \$1,442

$$r_{BABA} = \frac{P_{t+1}}{P_t} - 1$$

$$r_{BABA} = \frac{\$87.81}{\$58.97} - 1$$

$$r_{BABA} \approx 0.4891 = 48.91\%$$

8. Consider the following. An investor buys 100 shares of Nvidia (NVDA) for \$109.18 each. She sold a quarter of her holdings for \$101.48 a week after buying all shares, and sold her remaining shares for \$206.81 a year later. What was the return on the stocks she sold?
- 7.05%
  - 65.30%**
  - 89.42%
  - 103.79%
  - 203.80%

**Solution:**

Since there are two separate sales, we can compute the returns separately and then take a weighted average of the two returns.

**Solution (Question 8, continued):**

The return on the first sale is as follows...

$$r_{NVDA,1} = \frac{\$101.48}{\$109.18} - 1$$

$$r_{NVDA,1} \approx -0.0705 = -7.05\%$$

The return on the second sale is as follows...

$$r_{NVDA,2} = \frac{\$206.81}{\$109.18} - 1$$

$$r_{NVDA,2} \approx 0.8942 = 89.42\%$$

The first sale related to 25% = 0.25 of the holdings (since she sold 25 out of 100 shares), and the second sale pertained to 75% = 0.75 of the holdings (since she sold 75 out of 100 shares).

Her total return is thus a weighted average, calculated as:

$$r_{NVDA} = -0.0705(0.25) + 0.8942(0.75)$$

$$r_{NVDA} = -0.017625 + 0.6705$$

$$r_{NVDA} \approx 0.653025 = 65.30\%$$

9. What is the return on a stock that traded at £40.38 at the time of purchase, paid dividends of £1.23, and was sold for £47.39?
- 20.41%**
  - 17.36%
  - 14.25%
  - 8.35%
  - 3.05%

**Solution:**

$$r_j = \frac{P_{t+1} + Div_{t+1}}{P_t} - 1$$

$$r_j = \frac{\pounds47.39 + \pounds1.23}{\pounds40.38} \approx 0.2041 = 20.41\%$$

10. An investor bought 25 shares of Red Mail Plc for £3.40 soon after the stock paid a dividend of £0.25. The investor sold his shares for £3.72 the day after he received a dividend of £0.27. What is his return?

- a. 16.76%
- b. 17.35%**
- c. 24.71%
- d. 18.93%
- e. 14.56%

**Solution:**

Since the stock was bought *soon after* the stock paid a dividend of £0.25, this particular investor did not receive this dividend.

Therefore, the £0.25 dividend per share is irrelevant for his return.

$$r_j = \frac{P_{t+1} + Div_{t+1}}{P_t} - 1$$

$$r_j = \frac{£3.72 + £0.27}{£3.40} - 1$$

$$r_j \approx 0.1735 = 17.35\%$$