Topic: Rule of 72

John invests 1000 in Anderson Bank. Based on the Rule of 72, John expects to have 2000 at the end of 18 years.

How much will John actually have at the end of 18 years?

Solution:

Using the Rule of 72, money doubles in $\frac{72}{i}$ years.

$$\frac{72}{i} = 18 \implies i = \frac{72}{18}\% = 4\% = 0.04$$

$$1000(1+0.04)^{18} = 1000(1.04)^{18} = 2025.82$$

Moses invests money at an annual effective interest rate of i. Under this interest rate, based on the Rule of 72, Moses expects his money to double in 10 years.

Amber borrows 10,000 at an annual effective interest rate of i. Amber will repay this loan with two payments of P. The first payment of P will be at the end of 2 years and the second payment of P will be at the end of 5 years.

Determine P.

Solution:

$$\text{Amount of time to double} = \frac{72}{\text{Interest Rate as a Percent}} \Longrightarrow \frac{72}{i} = 10 \Longrightarrow i = 7.2\%$$

Amber

$$10,000(1.072)^5 = P(1.072)^3 + P$$

$$P = \frac{10,000(1.072)^5}{(1.072)^3 + 1} = 6343.07$$

Carl has 10,000 to invest. He has the following options:

a. Invest 10,000 in the White Fund. Under this investment, Carl will receive 20,000 at the end of 10 years. Carl used the Rule of 72 to estimate that annual effective interest rate that he will earn is i.

b. Loan 10,000 to Patrick at a interest rate of i. Under the loan, Patrick would repay P at time 3 and $2P$ at time 7.

Note: The i in part a. is the same as the i in part b.

Determine P.

Solution:

Using the Rule of 72, money doubles in $\frac{72}{i}$ years.

$$\Longrightarrow i = \frac{72}{10} = 0.072$$

$$10,000 = P(1.072)^{-3} + 2P(1.072)^{-7}$$

$$P = \frac{10,000}{(1.072)^{-3} + 2(1.072)^{-7}} = 4899.41$$

Amber invests 50,000 in Abbott Bank earning an annual effective interest rate of i . Based on the Rule of 72, Amber expects to have 100,000 at the end of 12 years.

Calculate the amount the Amber will actually have at the end of 12 years.

Solution:

$$\text{Rule of } 72 ==> \frac{72}{i} = 12 ==> i = 6\%$$

$$\text{Amount in 12 years} = 50,000(1.06)^{12} = 100,609.82$$