

Department of Mathematics
College of Science
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Solutions
QUIZ---ACTU 262 Actuarial Corporate Finance
First Trimester, 27/10/2022

Question 1

What is the total amount accumulated after three years if someone invests \$1,000 today with a simple annual interest rate of 5 percent? With a compound annual interest rate of 5 percent?

- A. \$1,150, \$1,103 B. \$1,110, \$1,158 C. \$1,150, \$1,158 D. \$1,110, \$1,103

Solution: C.

Simple interest rate: $\$1,000 + (\$1,000) (0.05) (3) = \$1,150$

Compound interest rate: $1,000 (1 + 0.05)^3 = \$1,158$

1

Question 2

Suppose an investor wants to have \$10 million to retire 45 years from now. How much would she have to invest today with an annual rate of return equal to 15 percent?

- A. \$18,561 B. \$17,844 C. \$20,003 D. \$21,345

Solution: A.

$$PV = \frac{10,000}{(1 + 0.15)^{45}} = \$18,561$$

1

Question 3

You deposit \$10,000 today and is promised a return of \$17,000 in eight years. What is the implied annual rate of return?

- A. 6.86 % B. 7.06 % C. 5.99 % D. 6.07 %

$$FV = PV (1 + r)^n$$

$$17,000 = 10,000 (1 + r)^n$$

$$8 \ln(1 + r) = 1.7$$

$$r = 6.86\%$$

1

Question 4

Reem plans to invest an equal amount of \$2,000 in an equity fund every year-end beginning this year. The expected annual return on the fund is 15 percent. She plans to invest for 20 years.

- a) How much could she expect to have at the end of 20 years.
- b) What is the present value of Reem's investments?
- c) Suppose the investments is to be made at the beginning of every year, how much could she expect to have at the end of 20 years?

Solution

$$a) \quad FV = 2,000 \times \frac{(1+0.15)^{20}-1}{0.15} = 204,887.17$$

1

$$b) \quad PV = 2,000 \times \frac{1 - \frac{1}{(1+0.15)^{20}}}{0.15} = 12,518.66$$

1

$$c) \quad \text{Future Value of Annuity due} = \text{Future Value of Ordinary Annuity} (1+0.15) = \$235,620.24$$

1

Question 5

You've just joined the investment banking firm of Dewey, Cheatum, and Howe. They've offered you two different salary arrangements. You can have \$95,000 per year for the next two years, or you can have \$70,000 per year for the next two years, along with a \$45,000 signing bonus today. The bonus is paid immediately, and the salary is paid at the end of each year. If the interest rate is 10 percent compounded monthly, which do you prefer?

$$EAR = (1 + \frac{0.1}{12})^{12} - 1 = 10.47\%$$

1

First salary arrangement \$95,000 per year for the next two years

$$PV1 = \frac{95,000}{1.1047} + \frac{95,000}{1.1047^2} = 163,841.95$$

1

Second salary arrangement \$70,000 per year for the next two years along with a \$45,000 signing bonus today.

$$PV2 = 45,000 + \frac{70,000}{1.1047} + \frac{70,000}{1.1047^2} = 165,725.64$$

2

The present value for second offer is greater than first offer

So, we prefer second offer.