

The Time Value of Money

Physics and Mathematics of Sustainable Energy

College of the Atlantic, October 17, 2025

1. You have \$10,000 that you put in a bank account that gets two percent interest.
 - (a) How much money will you have in five years?
 - (b) How much money will you have in ten years?
 2. In 15 years you wish to have \$20,000 to use as a down payment for a house. How much money should you deposit in a bank today in order to achieve this goal?
 - (a) Assume an interest rate of 3 percent.
 - (b) Assume an interest rate of 5 percent.
 3. Would you rather have \$10000 in five years, or \$9000 today?
 4. Suppose that in fifty years someone will give you a million dollars. What is the present value of this gift?
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5. You are considering an investment that will pay you \$2000 for the next three years. For this problem, assume a discount rate of 3%.
 - (a) In one year you will receive a payment of \$2000. What is the present value of this payment?
 - (b) In two years you will receive another payment of \$2000. What is the present value of this payment?
 - (c) In three years you will receive yet another payment of \$2000. What is the present value of this payment?
 - (d) What is the total present value of all three of these payments?
 6. Repeat problem 5 using a discount rate of 5%.
 7. Repeat problem 5 using a discount rate of 7%.

| Year | $r = 0.03$ | $r = 0.05$ | $r = 0.07$ |
|--------------|------------|------------|------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| TOTAL | | | |

8. How much would you pay for the investment described in problem 5?