

# Time Value of Money Problems

## Handout 2

1. You're trying to save up for a big vacation. You want to take a trip around the world when you graduate in three years. If you can earn 16% on your investments, how much would you have to deposit in order to have \$20,000 when you graduate?
2. Would you rather have \$463 now or \$1000 10 years from now? You can earn 6% on any investments.
3. You can buy a mortgage from a mortgage broker. Mortgage payments are \$30,000 per year and there are 16 years to maturity. The broker is asking \$325,000 for the note. You already hold similar mortgages and they yield 12%. Should you buy this note?
4. At an interest rate of 12% how long would it take a sum of money to double?
5. At 8% how long would it take to triple your money?
6. Your uncle lends you \$1000 today with the promise that you pay him back \$1728 in three years. What rate of interest is he charging you?
7. Your company is required to pay into a sinking fund each year in order to meet an obligation which matures in 10 years. The amount of the obligation is \$100,000 and you can earn 4% on your deposits. How much must your company deposit each year in order to meet these needs?
8. Your company borrows \$150,000 agreeing to pay the balance in 10 equal installments to include principal plus 8% interest. What should the payments be?
9. Your aunt is 80 years old. Over the years she has accumulated savings of \$170,000. She estimates that she will live another 10 years at the most and wants to spend her savings. She places her money in an account earning 7%. She will make 10 equal annual withdrawals. How much will she be able to withdraw each year?
10. A firm purchases 100 acres of land for \$200,000 and agrees to remit 20 equal annual installments of \$41,067 each. What is the annual interest rate on this loan?

11. Find the interest rates or rates of return on each of the following:
- You borrow \$200 and promise to pay back \$210 at the end of one year.
  - You borrow \$20,000 and promise to pay back \$32,578 at the end of 10 years.
  - You borrow \$2000 and promise to make payments of \$514.18 per year for five years.
12. You borrow \$15,000 and agree to repay the balance in five equal annual installments to include principal plus 8% interest. What should the payments be?
13. Your company has a \$1,000,000 bond issue that matures in 15 years. The bond indenture requires annual payments into a sinking fund. You figure that you can earn 10% on all deposits. What must the sinking fund payments be, assuming they are equal?
14. You are paying into a sinking fund that earns 6%. If the payments are \$15,000 per year, how much will be in the fund in 15 years?
15. Your broker offers to sell you a note for \$11,300 that will pay \$2000 per year for 10 years. If you buy the note, what rate of interest will you be earning?