Key

Oct. 1 Worksheet

1. What do the following terms mean?

Annuity

Sequence of equal payments made at equal periods of time

Payment period

time between payments

Term of annuity

time from beginning of first payment period to the end of the last payment period

Ordinary annuities

payments made at the end of the period

2. $1200 is deposited at the end of each year for the next 5 years in a savings account paying 6% interest compounded annually. Find the future value of this annuity. (Ordinary Annuity)

Year	Balance @ Start of Period	Compounding	Compound Amount	End of Year Payment	End of Year Balance
1	0	0 × 1.06	0	1200	1200
2	1200	1200 × 1.06	1272	1200	2472
3	2472	2472 × 1.06	2620.32	1200	3820.32
4	3820.32	3820.32 × 1.06	4049.54	1200	5249.54
5	5249.54	5249.54 × 1.06	5564.51	1200	6764.51

3. What is the formula for the future value of an Ordinary Annuity? What are the formulas to use for Excel to find future value, payment, and rate?

$$FV = Pmt\left[\frac{(1+i)^n - 1}{i}\right]$$

final value → =FV(
payment → =PMT(
rate → =RATE(

4. A recent college graduate starts their first full-time job and decides to save for a down payment on a house. They deposit $12,000 at the end of each year for 5 years into a high-yield savings account. The account pays an annual interest rate of 3.5% compounded annually. How much will they have saved after 5 years?

$64,349.59

5. Tom opened a savings account at a new online bank on January 1, 2024. The bank offers a fixed annual interest rate of 2.16%, compounded monthly. Tom contributed $450 a month to the account. What will be the total value of his account after 8 years?

$47,110.93

6. Suppose after 8 years, Tom decided to invest that money into a different account and kept the monthly contribution as $450. If the interest rate is 2.79% and compounding frequency remains monthly, how much will he have in the account after an additional 4 years?

$75,489.65

7. A business sets up a sinking fund to pay off bonds that it has issued when they mature. It deposits $15,000 at the end of each quarter into an account that earns 4.8% interest, compounded quarterly. How much will be in the sinking fund after 8 years?

$580,991.86

8. A company takes out a loan of $2 million to expand its manufacturing plant; the loan requires them to set up a sinking fund to pay off the principal in 10 years. If the fund earns 5.5% interest, compounded annually, what is the payment the company should make at the end of each year?

$155,335.54

9. As an incentive for a valued employee to remain on the job, a company plans to offer her a $50,000 bonus, payable when she retires in 15 years. If the company deposits $150 a month into a sinking fund, what interest rate must it earn, with monthly compounding, in order to guarantee that the fund will be worth $50,000 in 15 years?

7.58%