

Practice Test 6: Compound Interest

K: _____	C: _____	A: _____	T: _____
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PART A: Multiple Choice Questions

Instructions: Circle the English letter of the best answer. Circle one and **ONLY** one answer.

Knowledge/Thinking:

1. Which formula is not related to compound interest?

- (a) $A = P(1+i)^n$ (b) $P = A(1+i)^{-n}$ (c) $P = \frac{A}{(1+i)^n}$ (d) $A = \frac{P}{(1+i)^{-n}}$ (e) $A = P(1-i)^n$

2. When money is invested at 5% per year, compounded semi-annually, for five years,

- (a) $n = 5$ and $i = 0.05$ (b) $n = 5$ and $i = 0.025$ (c) $n = 10$ and $i = 0.025$ (d) $n = 10$ and $i = 0.05$

3. When changing the compounding period on an investment, which statement is true?

- (a) More frequent compounding results in a greater amount of interest.
 (b) More frequent compounding results in the same amount of interest.
 (c) More frequent compounding results in a lesser amount of interest.
 (d) More frequent compounding changes both the principal and amount, so there is no consistent result.

4. Which of the following scenario has $A = 5000(1.04)^8$ as the solution to find the amount of the investment at the end of the term?

- (a) Nissan invests \$5000 at 4%, compounded annually for 8 years.
 (b) Toyota invests \$5000 at 8%, compounded semi-annually for 4 years.
 (c) Honda invests \$5000 at 16%, compounded quarterly for 2 years.
 (d) All of the above
 (e) None of the above

5. For the formula $I = Prt$, the unit for t must be in:

- (a) years (b) months (c) weeks (d) days (e) hours

6. Ms. Chor invested in a 180-day term deposit at the bank earning 4% simple interest. She earned \$98.63 in interest. How much did she receive at maturity?

- (a) $\frac{98.63}{(0.04)\left(\frac{180}{365}\right)}$ (b) $98.63 + \frac{98.63}{(0.04)(180)}$ (c) $98.63 + \frac{98.63}{(0.04)\left(\frac{180}{365}\right)}$ (d) $98.63 + \frac{98.63}{(4)\left(\frac{180}{365}\right)}$

7. A \$10 000 debt is due in three years, and interest on the loan is 5% per year, compounded monthly. Calculate the discounted value of the loan today.

- (a) \$11 614.72 (b) \$8 609.76 (c) \$860.97 (d) \$8 638.38 (e) \$10 000

Part B: True or False Questions

Instruction: Read each of the following statements carefully.

State whether each statement is true (T) or false (F) in the space provided.

Knowledge:

- 1. Simple interest models linear growth; compound interest models quadratic growth. _____
- 2. Interest is affected by the principal invested, annual interest rate and length of time invested. _____
- 3. For $A = P(1 + i)^n$, n is the number of years money has been invested or borrowed. _____
- 4. Longer term of investment results in greater final amount and greater present value. _____
- 5. Higher annual interest rate results in lesser present value and greater final amount. _____

Part C: Full Solution Questions

Instructions: Show all steps for full mark. Marks will be deducted for poor or improper form.

Provide answer statements in complete English sentences where applicable.

Knowledge:

- 1. How long does it take for a \$2500 investment to double its value at 5% simple interest per year? [K: 3]

- 2. \$3000 was invested for 120 days and made \$35.51 in simple interest. What was the annual interest rate on the investment? [K: 2]

- 3. A 9-month GIC earns 4% simple interest per year. What is the value of the GIC when it matures if \$5200 is invested? [K: 3]

Communication:

4. State the differences between an investment earning simple interest and an investment earning compound interest. [C: 4]

5. Examine the given screen from the online TVM Solver and answer the following questions:

Name	Value	Compute
Present Value	500.00	PV
Future Value	-597.81	FV
Number of Payments	12.00	NP
Payment Amount	0.00	PMT
Interest Rate per period, %	1.500000	IR
Payment At:	<input type="radio"/> Beginning <input checked="" type="radio"/> End	

Computation complete.

(a) What is the compounding frequency if the term is 6 years? [C: 1]

(b) What are the annual interest rate **and** the term if interest is compounded quarterly? [C: 2]

(d) Why is the future value negative? [C: 1]

6. Create a compound interest scenario with the final amount calculated as $A = 2000(1 + 0.02)^6$. [C: 4]

7. Create a compound interest scenario with the principal calculated as $P = 4000(1 + 0.04)^{-12}$. [C: 4]

Application:

8. Eric needs to borrow \$2000. Which loan should he take? Justify your choice. [A: 8]

Loan A: \$2000 for three years at 10% per year, compounded semi-annually

Loan B: \$2000 for three years at 9.2% per year, compounded quarterly

9. Jeeva is 10 years old. His parents have decided to invest some money for his education, so that he will have \$15 000 at age 18 when he goes to college. If the investment can earn 6.6% per year, compounded monthly, how much will his parents need to invest? [A: 4]

10. A \$1000 investment earns interest at 4% per year, compounded quarterly. How long will it take to double the value of the investment? [A: 4]

Thinking:

11. Jay wants to buy a car. Which is the best deal, with interest rates at 5% per year, compounded semi-annually? Justify your choice. [T: 8]

Plan A: Pay \$16 250 in cash now

Plan B: Pay \$1000 down plus \$15 500 in one year

Plan C: Pay \$500 down plus \$16 000 in one year

12. Emily borrowed \$3600 at 6% per year, compounded quarterly. After the second year, she repaid \$2000. She is expected to repay the loan in full after four years. How much must she repay? [T: 4]

13. Elizabeth will inherit \$30 000 when she turns 21 in six months. She will borrow money today to purchase a new car and will pay off the principal plus interest in a lump sum with her inheritance. The bank offers short-term loans at a rate of 8% per year, compounded monthly.

(a) How much can Elizabeth borrow for the new car? [T: 3]

(b) How much of the \$30 000 payment will be interest? [T: 1]

Answers:

Part A:

1. e; 2. c; 3. a; 4. d; 5. a; 6. c; 7. b

Part B:

1. F; 2. T; 3. F; 4. F; 5. T

Part C:

1. 20 years; 2. 3.6%; 3. \$5356;

4. Simple interest grows linearly, but compound interest grows exponentially. Principal of simple interest stays the same throughout the term, but principal of compound interest increases by the average rate of interest at the end of each compounding period, so there is a new principal for each compounding period throughout the term;

5. (a) semi-annually, (b) 6%, 3 years, (c) Either PV or FV must be negative for the program to work;

6. Answer may vary. Nina invests \$2000 at 2% per year, compounded annually. What is the value of the investment after 6 years? **or** JP invests \$2000 at 4% per year, compounded semi-annually. What is the value of the investment in 3 years?;

7. Answer may vary. Jemel needs \$4000 in 6 year. How much does he have to invest today at 8% per year, compounded semi-annually? **or** Michael needs \$4000 in 1 year. How much does he have to invest today at 48% per year, compounded monthly?;

8. Loan B, Repay \$52.44 less for Loan B (\$2680.19 – \$2627.75); **9.** \$8859.56; **10.** 17 years and 6 months;

11. Plan C, it has the least present value or cost (A: \$16250, B: \$15753.12, C: \$15729.03);

12. \$2315.37; **13.** (a) \$28827.51, (b) \$1172.49