

SHOW YOUR WORK! Record your answer in double line block

ALGEBRA REVIEW p 105

The definition of an exponent is $a^m = a \cdot a \cdot \dots \cdot a$

↑
 m factors

When multiplying like bases, add exponents $a^m \cdot a^n = a^{m+n}$ Simplify.

Example: $(x^2 \cdot x^3) \cdot x \cdot x \cdot x = (x^2 \cdot x^3) \cdot x^3 = x^5 \cdot x^3 = x^8$

1. $x^1 \cdot x^3$	$x^1 \cdot x^3 =$
2. $2 \cdot 2^3$	$2 \cdot 2^3 =$
3. $x^6 \cdot x^2$	$x^6 \cdot x^2 =$
4. $b^6 \cdot b^2$	$b^6 \cdot b^2 =$
5. $3y^4 \cdot 5y^4$	$3y^4 \cdot 5y^4 =$
6. $3y^4 \cdot 5y^4$	$3y^4 \cdot 5y^4 =$
7. $(a \cdot a) \cdot a^4$	$(a \cdot a) \cdot a^4 =$
8. $p(1 + r)^n \cdot (1 + r)$	$p(1 + r)^n \cdot (1 + r) =$
Simplify. Use the exponent key 0 of a calculator. Give answers to~ the nearest hundredth. Example: $[(1.02)^4] [(1.02)(1.02)(1.02)] = (1.02)^4 (1.02)^3$ $= 1.02^7$ $= 1.15$	
9. $15,000(1.01)^3(1.01)$	$15,000(1.01)^3(1.01) =$
10. $(1.035)^2(1.035)(1.035)$	$(1.035)^2(1.035)(1.035) =$

Instructions: Complete each item as indicated

Answer in complete sentences.

1. What is simple interest?

2. What is compound interest?

3. Do you think you will earn more interest on a savings account if the compounding is done quarterly rather than semiannually? Will the difference in the interest be very large?

4. What advantages do you give up to earn interest in a savings account rather than in some other kind of investment?

Page 110 - TRY YOUR SKILLS

Instructions: Complete each item as indicated

TRY YOUR SKILLS

Use a calculator to find the amount of interest and the new balance that will accumulate over two years on the following principal amounts at the given interest rate compounded as shown.

X	Principal	Interest Rate	How Often Compounded	Interest Earned		New Balance
				First period:	Second period:	
1.	\$1000	6%	Annually	First period:		
				Second period:		
2.	\$1000	6%	Semiannually	First period:		
				Second period:		
				Third period:		
				Fourth period:		

Suppose that in 1776, Benjamin Franklin and other founders of our nation each decided to invest a small amount of money for their descendants. Assume that they were able to find a bank willing to pay 4% interest, compounded semiannually for the indefinite future. Use the compound interest formula $B = p(1 + r)^n$ to find the amount that each investment will be worth after the indicated number of years have passed. Remember that for twice-a-year compounding the number of periods is twice the number of years and the interest rate for each 6-month period is $0.04 / 2$, or 0.02 .

3. Thomas Jefferson invested \$100.00 for 30 years.

ANS:

4. Paul Revere invested \$50.00 for 90 years.

ANS:

5. John Hancock invested \$20.00 for 200 years.

ANS:

6. Use the Rule of 72 and your calculator to find the year in which \$1 that Benjamin Franklin invested in the year 1776 at 8% compounded quarterly would have become worth over \$2000. Organize your results in a table like the one below.

Doublings	Years Passed	Balance	Doublings	Years Passed	Balance
1			7		
2			8		
3			9		
4			10		
5			11		
6			12		

7. Assume that Nelson has \$25,000 to invest and that he expects to earn 9% per year on his investment. The interest will be compounded quarterly. Use the Rule of 72 to approximate how long it will take for Nelson's money to double repeatedly until it has grown to more than 1 million dollars.

8. Use the compound interest formula and a graphing calculator as in Skill 4 to check your answer to Exercise 7. Which method do you think is easier? Which is more accurate? Tell which method you prefer, and give a reason for your answer.

Page 112 - KEY TERMS

1. Compound interest:

2. Compounded quarterly

3. Compounded semiannually

4. Rule of 72:

Page 112 - EXERCISE YOUR SKILLS

Instructions: Complete each item as indicated
 Fill in the missing numbers. (Do not write in your book.)

1. Interest that is compounded annually is paid every _____ months.
2. Interest that is compounded semiannually is paid every _____ months.
3. Interest that is compounded quarterly is paid every _____ months.
4. 5% interest compounded annually means _____ paid every _____ months
5. 6% interest compounded quarterly means _____ paid every _____ months.

Use a calculator to find the amount of interest and the new balance that will accumulate over two years on the following principal amount at the given interest rate compounded as shown. The first quarter is done for you as an example.

	Principal	Interest Rate	How Often Compounded	Interest Earned		New Balance
6.	\$ 1000	6%	Quarterly	First period:	\$15	
7.				Second period:		
8.				Third period:		
9.				Fourth period:		
10.				Fifth period:		
11.				Sixth period:		
12.				Seventh period:		
13.				Eighth period:		

Suppose that in 1789, John Adams invested \$7.50 in a bank at 4.5% compounded semiannually and stipulated in his will that the money was to be allowed to accumulate in the account after his death. Use the compound interest formula to find the value of the account in each case.

14. After 50 years

15. After 70 years

16. After 100 years

17. In Exercise 16, suppose that the interest rate is 6% instead of 4.5%. Find the value of the account after 100 years. Compare the two results. What conclusion do you draw from them?

Nelson has invested \$5000 in a CD. The interest is compounded annually. Use the Rule of 72 to find how many years it will take for the investment to grow to \$40,000 at the given rates of interest.

18. 2%

19. 6%

20. 8%

21. 10%

In the year that Nelson was born, Nelson's father invested \$15,000 in an investment fund that has been paying 8% interest compounded quarterly. Use the graphing method outlined in Skill 4 to determine how long it will take for the \$15,000 to grow enough to pay for Nelson's costs of attending college. Nelson estimates the costs of several colleges to be as given below.

22. \$75,000

23. \$45,000

24. \$37,500

25. \$52,500

26. Nelson plans to begin college at age 18. Which of the above amounts will be impossible to acquire by then?

ANS:

27. At the age of 19, Robert placed \$2000 into an investment at 6% compounded annually and added no money to the investment for the rest of his life. His friend Amos, who was the same age, waited until he was 30 to begin his investment program by also investing \$2000 at 6% compounded annually. Later, at age 40, Amos invested another \$2000 at 6% compounded annually, and still later, at age 50, he invested the final \$2000 of his \$6000 investment on the same interest terms. Use the compound interest formula to show that at age 60, when they both retire next year, Robert's investment will have grown to a larger amount than Amos's. How much will each investment be worth?

Robert:

Amos:

Page 113 - MIXED REVIEW

Instructions: Complete each item as indicated. **SHOW YOUR WORK**

Find the commission earned and the total monthly earnings for each salesperson.	
Ch- Lesson 1-3	1. Paul, with a monthly base salary of \$900 and a commission rate of 9% on sales of \$6975
1-3	2.
Suppose your bank statement shows a closing balance of \$236.50 and the following are not on the statement: deposit: \$80.00; check: \$18.37; ATM withdrawal: \$110.00. There is a service charge of \$1.50 on the statement but not in your checkbook.	
2-3	3. What amounts must be added to the bank statement balance?
2-3	4. What amounts must be subtracted from the bank statement balance?
2-3	5. What should be the balance in your checkbook before you do a reconciliation?
2-3	6. What should be the checkbook balance after you do a reconciliation?
2-1	7. Pauline thinks she will write about 120 checks a month in her new business. She expects to maintain an average balance of \$1500. Which of the following banks offers her the better deal? Explain your answer. Bank A: interest of 0.35% per month paid on the average balance and a charge of \$0.06 for each check. Bank B: no interest paid on the checking account and no charge for checks but a monthly service charge of \$6. See Additional Answers.