Unit 2 Test Prep

Exponential Functions

1. Use the table below to answer the following questions.

<u>x</u>	<u>f(x)</u>
0	128
1	64
2	32
3	16

What	is th	common	ratio?
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What is the initial value?

2. A local gym initially has 250 members. The number of members grows by 5% each year through new sign-ups.

Write an equation, M(t), that represents the number of members after t years.

How many members will the gym have after 8 years?

How long will it take for the gym to have 500 members?

3. The population of a small town is 8,000 people and is increasing at an annual rate of 3.5%.

Write an equation, P(t), that represents the population after t years.

What will the population be in 10 years?

How long will it take for the population to reach 15,000 people?

- 4. Find the equation of the exponential curve that passes through the points (0,3) and (2,75).
- 5. Rewrite the following exponential equations as a logarithmic equation:

$$5^3 = 125$$

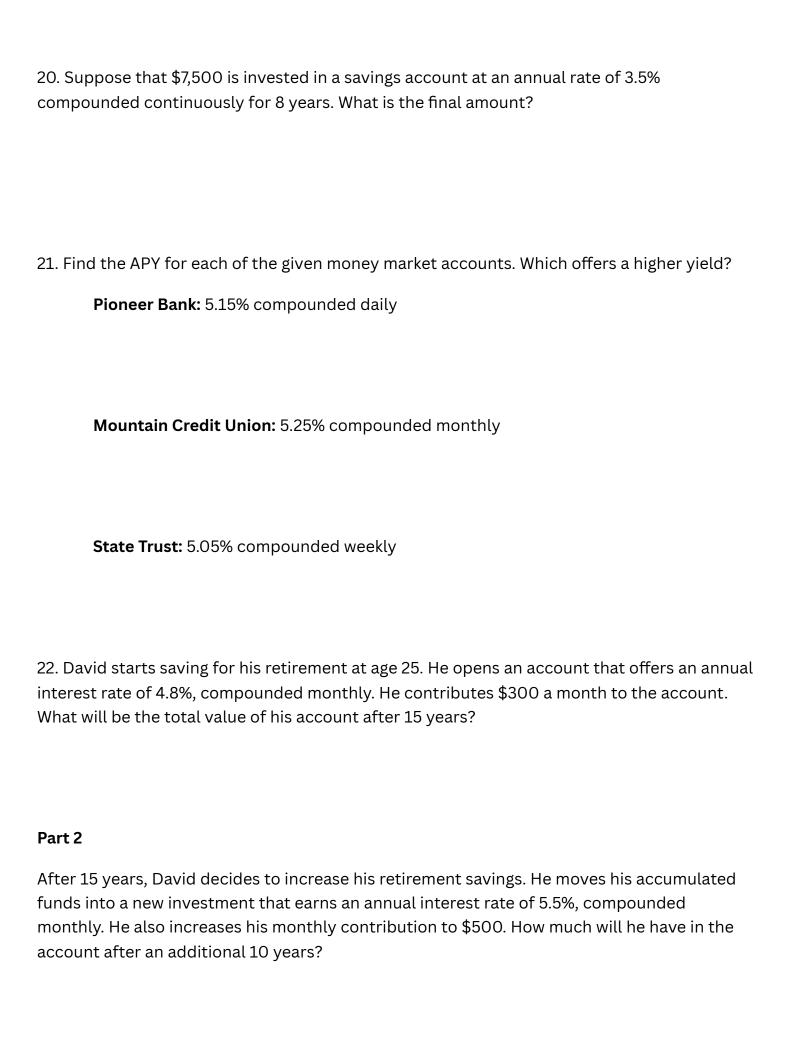
$$32^{x} = 164$$

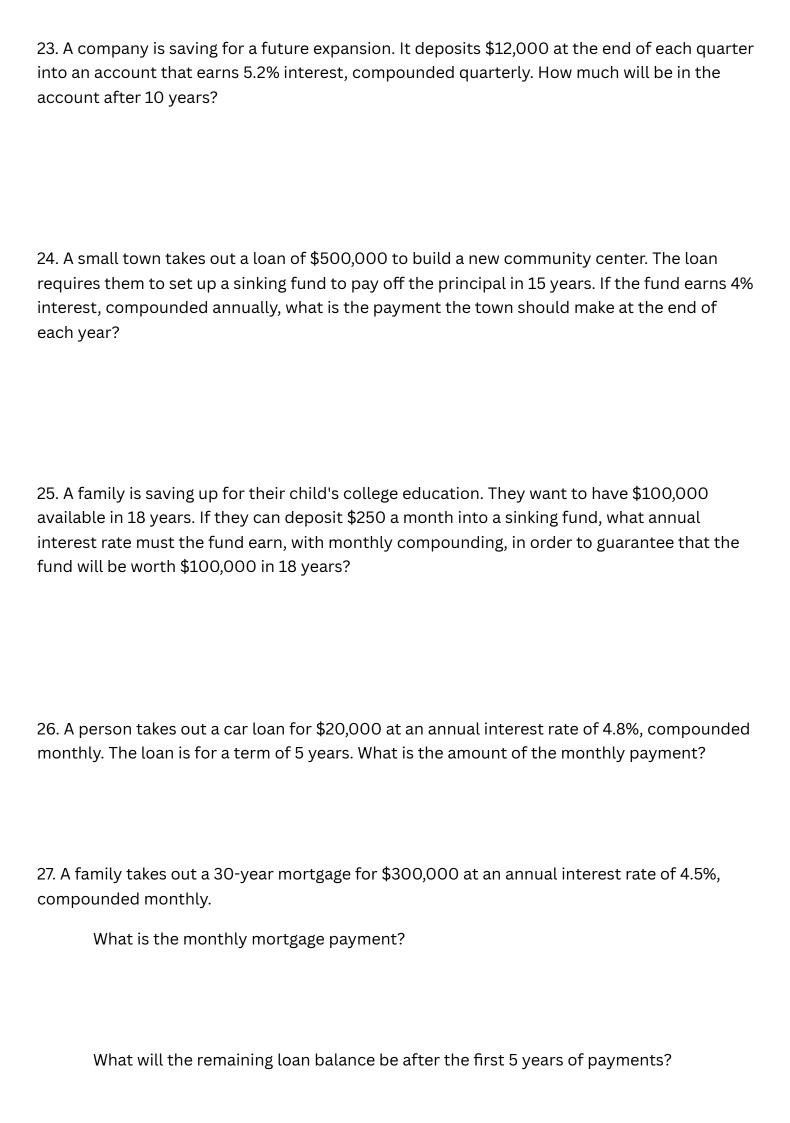
$$4^3 = 64$$

- 6. Rewrite the following exponential equation as a natural logarithmic equation: $e^x = 9$
- 7. Rewrite ln(7) = y as an exponential equation.
- 8. Rewrite $4e^{2x} = 20$ as a natural logarithmic equation.

9. A new online game is gaining players, with its user base growing by 15% every month. On September 1st, the game had 200,000 active players.
Find the function that predicts the number of active players, t months after September 1st.
Based on this trend, what is the estimated number of active players on January 1st of the following year?
10. John takes out a personal loan for \$8,000 at a simple interest rate of 6% per year. He plans to repay the loan in 5 years. How much will he pay in interest by the end of the loan period?
11. Sarah invests \$2,500 in a savings account that earns 4% simple interest per year. How much interest will she earn after 3 years? What will the final amount in her account be?
12. A loan of \$500 has a simple interest rate of 11% annually. If the total interest paid is \$55, what was the duration of the loan in years?
13. A 180-day short-term investment note (T-Bill) has a maturity value of \$2,000. If you purchase the note for \$1,970.50, what annual simple interest rate will you earn? Use a 360-day year.

14. A 45-day commercial paper is sold for \$9,885.50. If its maturity value is \$10,000, what is the annual simple interest rate earned? Use a 360-day year.
15. A small business owner purchases a 270-day bank note with a face value of \$15,000 for \$14,600. What is the annual simple discount rate for this transaction? Use a 360-day year.
16. If you deposit \$5,000 into a savings account that pays 4% interest compounded annually, how much money is in the account after 7 years?
17. You want to have \$18,000 in your savings account in 8 years. If your account earns 4.5% interest compounded annually, how much money do you need to deposit today?
18. A savings account with an initial deposit of \$5,000 grows to \$7,500 in 6 years. Assuming annual compounding, what is the annual interest rate?
19. After 5 years, your investment of an unknown principal has grown to \$25,000. The account earns 6% interest per year, compounded quarterly. What was your original principal investment?





28. A person saves for retirement by depositing \$500 at the beginning of each month into an account that earns 6% annual interest, compounded monthly. What will the total value of the account be after 30 years?
29. You are considering a lease on a new piece of equipment that requires payments of \$2,500 at the beginning of each month for 4 years. The interest rate is 5.4% per year, compounded monthly. What is the present value of this lease?
30. A savings plan offers a rate of 4% compounded annually. What is the future value of a \$1,000 deposit made at the end of each year for 10 years?
What is the future value of a \$1,000 deposit made at the beginning of each year for 10 years?

31. A small business takes out a loan for \$25,000 at an annual interest rate of 4.8%, compounded monthly. The loan term is 1 year. Create a full amortization table for this loan, showing the following for each monthly payment:

Payment Number	Amount of Payment	Interest Per Period	Portion to Principal	Balance
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				\$ 0