

Unit 6: Introduction to Exponential Functions

ADVANCED • SET 2

Name: _____ Date: _____

Show all work. Write answers as exact values or rounded as directed; money to the nearest cent.

1. An investment of \$2,500 is deposited in an account earning 6% interest compounded annually, modeled by $A(t) = 2500(1.06)^t$. Find the account balance after 8 years, rounded to the nearest cent.

Answer: _____

2. A new car worth \$32,000 depreciates by 15% each year. Using $V(t) = 32000(0.85)^t$, find the car's value after 5 years, rounded to the nearest cent.

Answer: _____

3. A quantity begins at 768 units and decreases by $\frac{1}{4}$ of its value each year. Find its exact value after 3 years.

Answer: _____

4. An exponential function $f(x) = a \cdot b^x$ passes through the points (0, 5) and (2, 80). Find the value of the base b ($b > 0$).

Answer: _____

5. An exponential function $f(x) = a \cdot b^x$ passes through the points (1, 12) and (3, 48). Find the value of a .

Answer: _____

6. A radioactive sample of 240 mg has a half-life of 8 years. How many milligrams remain after 32 years?

Answer: _____

7. \$1,200 is invested at a 4% annual rate compounded quarterly, modeled by $A(t) = 1200(1 + 0.04/4)^{4t}$. Find the balance after 3 years, rounded to the nearest cent.

Answer: _____

8. A bacteria population doubles every 25 minutes and starts at 500 cells. How many cells are present after 2.5 hours?

Answer: _____

9. A population is modeled by $f(t) = 800(1.05)^t$, where t is in years. Find $f(10)$, rounded to the nearest whole number.

Answer: _____

10. A substance decays according to $A(t) = A_0 \cdot (0.92)^t$, where t is measured in years. What is the percent decrease per year?

Answer: _____

11. A population grows exponentially from 8,000 to 12,500 over 2 years. For the model $f(x) = a \cdot b^x$, find the annual growth factor b ($b > 0$).

Answer: _____

12. The value of a rare coin is modeled by $V(t) = 350(1.08)^t$ dollars, where t is in years. Find its value after 20 years, rounded to the nearest cent.

Answer: _____