

Unit 6: Introduction to Exponential Functions

ADVANCED

Name: _____ Date: _____

Show your work. Give each answer as an exact value unless told to round; use 2^3 , $\sqrt{16}$, and fractions like $\frac{3}{4}$ in plain text.

1. A colony of bacteria starts at 240 cells and triples every 5 hours. Write the function does not matter; find the number of cells after 20 hours.

Answer: _____

3. A savings account of \$1,500 grows at 6% per year compounded annually. What is the balance after 10 years, rounded to the nearest cent? Use $A = 1500 \times (1.06)^{10}$.

Answer: _____

5. The population of a town grows according to $P(t) = 12000 \times (1.04)^t$, where t is in years. By what factor does the population grow over 25 years? Round to two decimal places.

Answer: _____

7. A quantity decays so that it is multiplied by $\frac{4}{5}$ each step. If it starts at 5000, what is its value after 3 steps?

Answer: _____

9. An investment grows by 8% each year. Write its yearly growth factor as a decimal, then find the total percent growth over 2 years (as a percent, rounded to two decimals).

Answer: _____

2. An exponential function has the form $f(x) = a \times b^x$. Given $f(0) = 6$ and $f(3) = 162$, find the value of b .

Answer: _____

4. A radioactive sample has a half-life of 8 days. If you start with 640 mg, how many mg remain after 40 days?

Answer: _____

6. An exponential function passes through (2, 45) and (4, 405) with equation $y = a \times b^x$. Find the value of a .

Answer: _____

8. A culture doubles every 3 hours. Written as $A = A_0 \times 2^{(t/3)}$ with $A_0 = 50$, how many hours does it take to reach 3200? Give t as a whole number.

Answer: _____

10. A function is defined by $g(x) = 7 \times (1/2)^x$. Compute $g(-3)$.

Answer: _____

11. A drug in the bloodstream decreases by 25% each hour. Starting at 480 mg, after how many whole hours does the amount first drop below 120 mg? Use $480 \times (0.75)^t$.

Answer: _____