1. A substance grows exponentially according to the function \( n(t) = n_0 e^{rt} \), where \( n(t) \) is the quantity after \( t \) hours and \( n_0 \) is the original quantity. If the substance grows from 400 grams to 600 grams in 2 hours, how many will be present after 4 hours?

Solution: 900 grams

2. A bacterial culture grows exponentially according to the function \( n(t) = n_0 e^{rt} \), where \( n(t) \) is the quantity after \( t \) hours and \( n_0 \) is the original quantity. If the culture grows from 2 grams to 128 grams in 3 hours, how many grams were there after 2 hours?

Solution: 32 grams

3. A bacterial culture grows exponentially according to the function \( n(t) = n_0 e^{rt} \), where \( n(t) \) is the quantity after \( t \) hours and \( n_0 \) is the original quantity. If the culture grows from 20 bacteria to 45 bacteria in 2 days, how many bacteria will there be in 5 days?

Solution: \( \frac{5}{8} \cdot (3)^5 = 151.875 \) bacteria

4. A radioactive substance has a half-life of 8 years. If 200 grams are present initially, how much will remain at the end of 12 years?

Solution: \( 200 \cdot \left( \frac{1}{2} \right)^{\frac{12}{8}} = 70.711 \) grams

5. A bacterial culture grows exponentially according to the function \( n(t) = n_0 e^{rt} \), where \( n(t) \) is the quantity after \( t \) hours and \( n_0 \) is the original quantity. If the culture grows from 100 grams to 800 grams in 3 hours, how many grams will there be in 4 hours?

Solution: 1600 grams

6. The amount of money, \( A(t) \), in a savings account after \( t \) years of continuously compounding interest is given by the function \( A(t) = A_0 e^{rt} \). Suppose that the money in the account grew from $100 to $800 in 3 years, How much money would be in the account after 4 years?

Solution: $1600