Discrete Exponential Growth and Decay

Solve each discrete exponential growth/decay problem. You may use the provided graph to plot points or sketch the exponential function.

1) An employee receives a 2% raise once per year. If the employee's initial salary is $60,000.00, what will the employee's salary be after 9 years?

2) A new social media site is increasing its user base by approximately 6% per month. If the site currently has 21,740 users, what will the approximate user base be 8 months from now?

3) A robot vacuum cleans a dirty floor using multiple passes. During each pass, 22% of the dirt is removed. If the floor initially has 530.0 ml of dirt, how much dirt will remain after 10 passes?

4) A country pledges to reduce its annual CO₂ emissions by 3% per year. If the emissions in 2022 are 3,030 Mt (metric megatons), what are the maximum allowable emissions in the year 2028?
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Solve each discrete exponential growth/decay problem. You may use the provided graph to plot points or sketch the exponential function.

1) An employee receives a 2% raise once per year. If the employee's initial salary is $60,000.00, what will the employee's salary be after 9 years?

\[ \text{salary in dollars} \]

\[ 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10 \quad 11 \]

\[ 10000 \quad 20000 \quad 30000 \quad 40000 \quad 50000 \quad 60000 \quad 70000 \quad 80000 \]

\[ 60000 \times 1.02^9 \approx 71,705.55 \]

2) A new social media site is increasing its user base by approximately 6% per month. If the site currently has 21,740 users, what will the approximate user base be 8 months from now?

\[ \text{users} \]

\[ 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10 \]

\[ 5000 \quad 10000 \quad 15000 \quad 20000 \quad 25000 \quad 30000 \quad 35000 \quad 40000 \]

\[ 21740 \times 1.06^8 \approx 34,650 \text{ users} \]

3) A robot vacuum cleans a dirty floor using multiple passes. During each pass, 22% of the dirt is removed. If the floor initially has 530.0 ml of dirt, how much dirt will remain after 10 passes?

\[ \text{ml of dirt remaining} \]

\[ 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10 \quad 11 \]

\[ 100 \quad 200 \quad 300 \quad 400 \quad 500 \quad 600 \quad 700 \]

\[ 530 \times 0.78^{10} \approx 44.2 \text{ ml} \]

4) A country pledges to reduce its annual CO₂ emissions by 3% per year. If the emissions in 2022 are 3,030 Mt (metric megatons), what are the maximum allowable emissions in the year 2028?

\[ \text{CO₂ emissions in Mt} \]

\[ 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10 \quad 11 \quad 12 \]

\[ 300 \quad 500 \quad 700 \quad 900 \quad 1100 \quad 1300 \]

\[ 3030 \times 0.97^6 \approx 2,524 \text{ Mt} \]