Q1: Due to an innovative rural public health program, infant mortality in a West African country is being reduced at an annual rate of 7% per year.

A. Find the exponential function that models this information.

\[ P = P_0 \cdot (0.93)^t \]

B. How long will it take for infant mortality to be reduced by 50%?

\[
\frac{1}{2} P_0 = P_0 \cdot (0.93)^t \\
0.5 = (0.93)^t \\
\ln(0.5) = t \cdot \ln(0.93) \\
t = \frac{\ln(0.93)}{\ln(0.5)} \\
t = 9.551 \text{ years}
\]

C. Find the continuous rate of decay function that is equivalent to the function found in A.

\[
P = P_0 \cdot e^{kt} \\
0.93 = e^{kt} \\
k = \ln(0.93)
\]

Q2: Answer A and B using the functions \( f(x) = \frac{3}{x} \) and \( g(x) = x^2 + 4 \).

A. \( f(g(-2)) = \frac{3}{8} \)

B. \( g(f(-2)) = \frac{25}{4} \)

Q3: A. Given the graph of \( y = h(x) \) sketch the graph of \( y = -h(x) + 1 \)

B. Using \( y = h(x) \) above, what is the value of \( h(0) \)? \(-2\)

\[ h(0) = -2 \]
Q1: Due to an innovative rural public health program, infant mortality in a West African country is being reduced at an annual rate of 9% per year.

A. Find the exponential function that models this information.

\[ P = P_o \cdot (0.91)^t \]

B. How long will it take for infant mortality to be reduced by 50%?

\[
\frac{1}{2} P_o = P_o \cdot (0.91)^t
\]

\[ 0.5 = (0.91)^t \]

\[ \ln(0.5) = t \cdot \ln(0.91) \]

\[ t = \frac{\ln(0.5)}{\ln(0.91)} = 7.35 \text{ years} \]

C. Find the continuous rate of decay function that is equivalent to the function found in A.

\[ P = P_o \cdot e^{kt} \]

\[ e^k = 0.91 \]

\[ k = \ln(0.91) \]

\[ P = P_o \cdot e^{-0.0943t} \]

Q2: Answer A and B using the functions \( f(x) = \frac{2}{x} \) and \( g(x) = x^2 + 3 \).

A. \( f(g(-4)) = \frac{2}{19} \)

B. \( g(f(-4)) = 3 + 3.25 \cdot \frac{13}{4} = 12 \frac{1}{4} + 3 \)

Q3: A. Given the graph of \( y = h(x) \) sketch the graph of \( y = -h(x) - 1 \)

B. Using \( y = h(x) \) above, what is the value of \( h(h(0)) = -2 \)?
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A. \( f(g(-4)) = \) 

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