PROBLEMS AND SOLUTIONS - SOLVING EXPONENTIAL EQUATIONS
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PLEASE NOTE THAT YOU CANNOT ALWAYS USE A CALCULATOR ON THE ACCUPLACER - COLLEGE-LEVEL MATHEMATICS TEST! YOU MUST BE ABLE TO DO SOME PROBLEMS WITHOUT A CALCULATOR!

Problem 1:

Solve $10^{x} = 5.71$. Round to 4 decimal places.

Problem 2:

Solve $7e^{x} = 15$. Round to 4 decimal places.

Problem 3:

Solve $16^{x-1} = \frac{1}{2}$.

Problem 4:

Solve $9^{2x} = 27^{x+1}$ not using logarithms!

Problem 5:

Solve $5^{x-2} = 3^{2x+1}$. Round to 3 decimal places.

Problem 6:

How many years will it take for an initial investment of ***$10,000*** to grow to ***$25,000***? Assume a rate of interest of ***2.5%*** compounded continuously. Round your answer to a whole number. Use the formula $A = Pe^{rt}$, where P is the initial investment, A is the accumulated amount, t is the time in years and r is the interest rate in decimals.

Problem 7:

The number of bacteria A in a certain culture is given by the growth model $A = 250e^{kt}$. Find the growth constant k knowing that $A = 280$ when $t = 5$. Round your answer to four decimal places.

Problem 8:

The half-life of a radioactive substance is ***950 years***.. Find the constant ***k*** rounded to seven decimal places. Do not use scientific notation! Hint: Half-life means that exactly one-half of the original amount or size of the substance is left after a certain number of years of growth/decay. Use the *Exponential Growth/Decay Model* $A = A_0 e^{kt}$, where A_0 is the original amount, A is the accumulated amount, t is the time in years and k is the growth constant.

Problem 9:

The next problem involves carbon-14 dating which is used to determine the age of fossils and artifacts. The method is based on considering the percentage of a half-life of carbon-14 of approximately 5715 years. Specifically, the model for carbon-14 is $A = A_0 e^{-0.000121\,t}$.

In 1947, an Arab Bedouin herdsman found earthenware jars containing what are known as the Dead Sea scrolls. Analysis at that time indicated that the scroll wrappings contained 76% of their original carbon-14. Estimate the age of the scrolls in 1947. Round your answer to a whole number.

SOLUTIONS

You can find detailed solutions below the link for this problem set!

1. $x \approx .7566$	2. $x \approx .7621$	3. $x = \frac{3}{4} = .75$
4. $x = 3$	5. $x \approx -7.345$	6. $t \approx 37$
7. $k \approx 0.0227$	8. $k \approx -0.0007296$	9. ***2,268*** years old