

Answer List

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|------------------------|-------------------------------------|--------------------------------------|
| 1. $\log 57 + \log x$ | 2. $5 \log n$ | 3. $3 \log n + 8 \log m$ |
| 4. $\log \frac{x}{90}$ | 5. $\log m^2 n^7$ | 6. $\frac{\log 137}{\log 5} = 3.057$ |
| 7. $x = 2$ | 8. $x = -1 + \ln 2.5 \approx -0.08$ | 9. $x = 0$ |
| 10. \$2969.01 | 11. B | 12. C |
| 13. B | 14. B | 15. D |
| 16. E | 17. A | 18. A |
| 19. C | 20. C | 21. C |
| 22. B | 23. A | |

SOLUTIONS

10. $A = \$2000 \left(1 + \frac{0.10}{4} \right)^{16}$ (4 TIMES/YEAR)(4 YEARS)

19. $2^{5x-1} = 3$ METHOD 1: $\log_2(2^{5x-1}) = \log_2(3)$

METHOD 2:

$5x-1 = \log_2(3)$

$x = \frac{1}{5}(\log_2(3) + 1)$

$x = \frac{1}{5}(\ln(3)/\ln(2) + 1) \approx 0.517$

Property of Log(Powers)

$\ln(2^{5x-1}) = \ln(3)$

$[5x-1] \cdot \ln(2) = \ln(3)$

20. $y = 17e^{0.05t}$

$y(9) = 17e^{0.05(9)} = 26.7 > 26$ thousand

CHANGE OF BASE

21.

METHOD 1:

$y = 100\% \cdot \left(\frac{1}{2}\right)^{t/60} = 100\% \cdot \left(\frac{1}{2}\right)^{45/60} = 59.46\%$

$t/60 = \#$ of half lives

METHOD 2:

$y = 100\% e^{-kt}$

$50\% = 100\% e^{-k \cdot 60}$. k UNKNOWN.

$\ln(50/100) = -k \cdot 60$ $k = -\ln(1/2)/60 \approx 0.011552453$

$y(45) = 100\% \cdot e^{-0.011552453 \cdot 45} = 59.46\%$

22. $9000 = 3000e^{0.12t} \rightarrow \ln(3) = 0.12t \rightarrow t = \ln(3)/0.12 = 9.16$ years.

23. INITIAL VALUE = 0.99.

$y = 0.9e^{kt}$. Solve for k : $1.8 = 0.9e^{k \cdot 7}$, $2 = e^{k \cdot 7}$ $k = \ln(2)/7 = 0.09902/\text{day}$