

$$4a) \frac{50e^{-7x}}{50} = \frac{21}{50}$$

$$\ln e^{-7x} = \ln \frac{21}{50}$$

$$\frac{-7x}{7} = \frac{\ln(\frac{21}{50})}{7} \approx .205$$

$$4b) \ln 3^{4x} = \ln 8^{x-5}$$

$$4x \ln 3 = (x-5) \ln 8$$

$$4x \ln 3 = x \ln 8 - 5 \ln 8$$

$$4x \ln 3 - x \ln 8 = -5 \ln 8$$

$$x(4 \ln 3 - \ln 8) = -5 \ln 8$$

$$x = \frac{-5 \ln(8)}{4 \ln(3) - \ln(8)} \approx -4.491$$

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$$3a) (3^{-2})^{x-2} = 3^{5-x}$$

$$-2x+4 = 5-x$$

$$3b) e^{\ln\left(\frac{4x+2}{3-x}\right)} = 1 \quad \left| \begin{array}{l} e^{\ln(x)} = \ln(x) \\ e^{\ln(x)} = x \end{array} \right.$$

$$4x+2 = 3-x$$

$$\frac{4x+2}{3-x} = 1$$

$$4x+2 = 3-x$$

$$3c) 2 \log_4 x = 3$$

$$\log_4 x^2 = 3$$

$$4^3 = x^2$$

$$64 = x^2$$

$$x = 8$$

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$$5) A = P(.5)^{t/h}$$

$$\ln .22 = \ln(.5)^{t/5730}$$

$$\ln(.22) = \frac{t}{5730} \ln(.5)$$

$$\frac{\ln(.22) \times 5730}{\ln(.5)} = t$$

$$\frac{\log(\% \text{ left}) \times h}{\log(.5)}$$

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$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$450 = 225\left(1 + \frac{.073}{12}\right)^{(12)t}$$

$$2 = \left(1 + \frac{.073}{12}\right)^{(12)t}$$

$$\ln 2 = \frac{12t \cdot \ln\left(1 + \frac{.073}{12}\right)}{12 \ln\left(1 + \frac{.073}{12}\right)}$$

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$$\begin{aligned}
 1b) \quad & \ln x^5 + \ln x^6 y^2 - \ln 2^{1/2} x^{1/2} y^2 \\
 & \ln x^{11} y^2 - \ln 2^{1/2} x^{1/2} y^2 \\
 & \ln \left(\frac{x^{11} y^2}{2^{1/2} x^{1/2} y^2} \right) \\
 & = \ln \left(\frac{x^{21/2}}{\sqrt{2}} \right)
 \end{aligned}$$

$$\begin{aligned}
 1a) \quad & \log \left(\frac{x-3}{x+2} \right) + \log 25 \\
 & \log \left(\frac{25x-75}{x+2} \right)
 \end{aligned}$$

$$\begin{aligned}
 8) \quad & A = Pe^{rt} \\
 & = 3000 e^{.03(7)}
 \end{aligned}$$

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