# Homework #2Answers     MATH 131

1. (a) I) decay at 9%

    II) decay at 9.43107%

   (b) I) growth at 41.5%

    II) growth at 34.71295%

   (c) I) decay at 22.5858%

    II) decay at 25.6%

2. (a) $y = 70(.88)^x$ or $y = 70e^{-0.1278333x}$

   (b) solve $35 = 70(0.88)^x$ for x

    exact answer: $x = \dfrac{\ln(0.5)}{\ln(0.88)}$ days

    approximate answer: $x = 5.42227$ days

   (c) solve $24.67 = 70(0.88)^x$ for x

    exact answer: $x = \dfrac{\ln\left(\frac{24.67}{70}\right)}{\ln(0.88)}$ days

    approximate answer: $x = 8.1583$ days

3. use the points $(0, 250)$ and $(5, 2000)$

   (a) $y = 250(1.515716567)^x$

   (b) 51.5717%

   (c) $k = \ln(1.515716567)$

    Answer: 41.5888%

4. (a) $\log_b \frac{35}{b^2} = \log_b 35 - \log_b b^2$
    $= \log_b 5 + \log_b 7 - 2$

    Answer: 4.1293

   (b) $\log_b(27b^5) = \log_b 3^3 + \log_b b^5$
    $= 3\log_b 3 + 5$

    Answer: 9.755

5. both of these can be done by hand or by calculator.

   (a) $40 * 5^x = 3 * 4^{2x}$
    $\ln(40) + x\ln(5) = \ln(3) + 2x\ln(4)$
    $x\left(\ln(5) - 2\ln(4)\right) = \ln(3) - \ln(40)$
    $x = \dfrac{\ln(3) - \ln(40)}{\ln(5) - 2\ln(4)}$
    or
    $x = 2.2269$

   (b) $200 = 950e^{-.0025x}$
    $x = \dfrac{\ln\left(\frac{20}{95}\right)}{-0.0025}$

    or $x = 623.2578$

6. (a) solve $7P_o = P_o(1.35)^x$
    $7 = 1.35^x$
    Answer: $x = \frac{\ln(7)}{\ln(1.35)} = 6.4841$

   (b) $x = 29.9737$ so
    29.9737 years after 1990.