

146 Solutions to homework assigned 12-3-19

4.2 # 87a. Semiannually means 2 times per year, so you are evaluating:

$$\left(1 + \frac{.05}{2}\right)^{9 \cdot 2} \cdot 8906.54 = (1.025)^{18} \cdot 8906.54 = 13891.16$$

88a. Quarterly means 4 times per year, so evaluate:

$$\left(1 + \frac{.053}{4}\right)^{23} \cdot 56,780 = (1.01325)^{23} \cdot 56,780 = 76855.95$$

Note that the time is given in quarters not in years, so you don't multiply by 4 in the exponent.

4.3 # 1a. $\log_2(16) = 4$ because $2^4 = 16$

b. $\log_3(1) = 0$ because $3^0 = 1$

c. $\log_{10} 0.1 = \log_{10} \frac{1}{10} = -1$ because $10^{-1} = \frac{1}{10} = 0.1$

d. $\log_2 \sqrt{2} = \frac{1}{2}$ because $2^{1/2} = \sqrt{2}$

e. $\log_e \frac{1}{e^2} = -2$ because $e^{-2} = \frac{1}{e^2}$

13. $x = \log_5 \frac{1}{625}$ means $5^x = \frac{1}{625} = \frac{1}{5^4} = 5^{-4}$ so $x = -4$

17. $x = \log_8 \sqrt[4]{8}$ means $8^x = \sqrt[4]{8} = 8^{1/4}$ so $x = 1/4$

19. $x = 3^{\log_3 8}$ means $\log_3 x = \log_3 8$ so $x = 8$ Also, 3^x and $\log_3 x$ are inverse functions, so $3^{\log_3 8} = 8$

21. $x = 2^{\log_2 9}$ means $\log_2 x = \log_2 9$ so $x = 9$ Also 2^x and $\log_2 x$ are inverse functions, so $2^{\log_2 9} = 9$

25. $\log_4 x = 3$ means $4^3 = x$ so $x = 4^3 = 64$

27. $x = \log_4 \sqrt[3]{16}$ means $4^x = \sqrt[3]{16} = \sqrt[3]{4^2} = (4^2)^{1/3} = 4^{2/3}$ so $x = 2/3$

29. $\log_9 x = \frac{5}{2}$ means $9^{5/2} = x$ so $x = 9^{5/2} = (9^{1/2})^5 = \sqrt{9}^5 = 3^5 = 243$