Answers to HW 2

Discrete Math

October 10, 2013

Section 3.1

40. $(\mathrm{f} \circ \mathrm{f})(\mathrm{x}) = n^4, (g \circ g)(x) = 2^{2n},\ (f \circ g)(x) = 2^{2n},\ (g \circ f)(x) = 2^{n^2}$

79. $\mathrm{S(X)} = 111$

Section 3.2

102. $7r_{n-1} - 10r_{n-2}$

$$= 7(3 \cdot 2^{n-1} - 4 \cdot 5^{n-1}) - 10(3 \cdot 2^{n-2} - 4 \cdot 5^{n-2})$$

$$= 3(7 \cdot 2^{n-1} - 10 \cdot 2^{n-2}) - 4(7 \cdot 5^{n-1} - 10 \cdot 5^{n-2})$$

$$= 3\left(\frac{7}{2}2^n - \frac{10}{4}2^n\right) - 4\left(\frac{7}{5}5^n - \frac{10}{25}5^n\right)$$

$$= 3 \cdot 2^n - 4 \cdot 5^n = r_n$$

112. $\sum_{k=0}^{n-1}(k+1)^2 r^{n-k-1}$

Section 3.3

29. Reflexive, symmetric, transitive

58. R is reflexive, symmetric, not antisymmetric, transitive, and not a partial order. To see that R is not antisymmetric, consider A = all real number and B = all rational numbers.

Section 3.4

17. { (1,1), (2,2), (3,3), (4,4) }, [i] ={i} for I = 1, . . . , 4

27. { (1,1), (2,2), (3,3), (4,4), (5,5), (6,6), (1,2), (2,1), (3,4), (4,3) }

58. False. Let $R_1 = \{(1,1),(1,2)\},\ R_2 = \{(2,2),(2,1)\}$.

Section 3.5

13. Take the transpose of the given matrix.

Section 3.6

18. TEMP1 := DEPARTMENT[Manager = Jones]

    TEMP2 := TEMP1[TEMP1.Dept = SUPPLIER.Dept] SUPPLIER

    TEMP3 := TEMP2[TEMP2.Part No = BUYER.Part No] BUYER

    TEMP4 := TEMP3[Name]

    United Supplies, JCN Electronics ABC Unlimited