Matrix Representations of Relations:
1. (2 points) Section 9.3, 12
2. (4 points) Section 9.3, 14(c)

Equivalence Relations:
3. (4 points) Section 9.5, 2(a,c)
4. (4 points) Section 9.5, 10. You don't need to write a complete proof, but we'll accept it!
5. (8 points) Section 9.5, 24(a,b) (And show your work!)

(Continued ...)
Partially–Ordered and Totally–Ordered Relations:

6. (2 points) Section 9.6, 8(c)

7. (4 points) Section 9.6, 10 (and, if so, which kind(s) of partial order(s)?)

8. (9 points) For each of the following relations on \{a, b, c, d\}, determine whether or not the relation is (i) a weak/reflexive partial order, (ii) a strict/irreflexive partial order, and/or (iii) a total order, all based on our in–class definitions. If the answer is ‘no’ for any of these, which of the requirements of the properties is the relation lacking, and why are those requirements lacking? For example, a relation that is not a weak/reflexive partial order may be lacking transitivity because it has an (a,b)-(b,c) pairing but is missing the (a,c) ordered pair.

   (a) \{(b, a), (c, a), (c, b), (d, a), (d, b), (d, c)\}
   (b) \{(a, a), (b, a), (b, b), (c, a), (c, b), (c, c), (d, a), (d, b), (d, c), (d, d)\}
   (c) \{(d, d), (c, c), (b, b), (c, d), (a, a), (a, b), (b, d), (a, c), (a, d)\}

9. (1 point) Consider the weak/reflexive partially–ordered relation \(R = \{(x, y) \mid x \% y = 0\}\), where \(x, y \in \mathbb{Z}^+\). Are the integers 6 and 18 comparable in \(R\)?

Functions:

10. (2 points) Section 2.3, 4(a)

11. (2 points) Section 2.3, 8(e,h)

12. (2 points) Section 2.3, 20(c). Rosen’s \(\mathbb{N}\) is our \(\mathbb{Z}^*\). See Section 2.1.1.

13. (2 points) Section 2.3, 22(a)

14. (2 points) Section 2.3, 64

15. (2 points) Section 2.3, 70(g)