# Class Discussion: 5 November 2019

**Relations; Equivalence relations**

1. What is meant by a *relation on the set S*?
2. Determine the relation for S = {0, 1, 3, 5, 8} defined by ≤.
3. For the set in (2) determine the relation for S = {0, 1, 3, 5, 8} defined by ≠.
4. What does it mean for R to be *reflexive*? *symmetric*? *transitive*?
5. What is an *equivalence relation* on S?
6. Explain how an equivalence relation corresponds to a partition on the set S.
7. What does the term *equivalence class* mean?
8. Determine which of the three properties “reflexive,” “symmetric,” and “transitive” apply to each of the following relations on the set of integers, Z. For each relation that is an equivalence relation, describe the equivalence classes.

a R b iff

1. a = b 2. a ≤ b 3. a < b, 4. a | b 5. |a| = |b|

6. a2 + a = b2 + b 7. a < |b|, 8. ab > 0 9. ab ≥ 0

1. a + b > 0 11. a ≡ b mod 4 12. a ≡ b mod m (where m > 0)
2. Do the same as in (1) for the following relations on the set of all people. p R q iff
   1. p “is a father of” q
   2. p “is a sister of” q
   3. p “is a friend of” q
   4. p “is an aunt of” q
   5. p “is a descendant of” q
   6. p “has the same height” as q
   7. p “likes” q
   8. p “knows” q
   9. p “is married to” q
   10. p is a Facebook friend of q
3. Let A = { 1,2,3,4}, and consider the following set:

S = { (1,1),(1,3),(3,1),(3,3),(2,2),(2,4),(4,2),(4,4)} ⊆ A × A. Can you guess what S means?













  