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I pledge my honor that I have abided by the Stevens Honor System

CS 135 Homework 3

Section 1.6

1. 1. Simplification
   2. Disjunctive Syllogism
   3. Modus Ponens
   4. Addition
   5. Hypothetical Syllogism

Section 1.7

1. Assume m and n are odd numbers. The definition of the odd integers are m = 2k + 1 and   
   n = 2r + 1. To show that m \* n is also odd, we can set m \* n equal to (2k + 1) \* (2r + 1).   
   m \* n = (2k + 1) (2r +1) = 4kr + 2k + 2r + 1. We can define m \* n as an odd integer because it is one more than twice our two integers plus 4\*k\*r (which is also even). This proves m \* n is odd.
2. 1. Assume 3n + 2 is an even integer and n is also an even integer. Substitute every n with “2k + 1” which is an odd integer.   
      3(2k + 1) + 2 = 2k + 1 6k + 3 + 2 = 2k + 1 6k +5 = 2k + 1  
      Both sides of the equation are odd, helping prove the contraposition correct.

Section 1.8

1. Case(i) : when x y, max(x, y) is x and min(x, y) is y, so with substitution “max(x, y) + min(x, y) = x + y” becomes x + y = x +y  
   Case(ii) : when x < y, max(x, y) is y and min(x, y) is x, so with substitution “max(x, y) + min(x, y) = x + y” becomes y + x = x +y. Using the commutative property, this becomes x + y = x + y

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| Statement | Reason |
| m^3 is an integer | Given |
| n^2 is an integer | Given |
| m = 2 and n =3 | Assignment by example |
| 2^3 = 8 | Math |
| 3^2 = 9 | Math |
| 8 and 9 are consecutive integers | Given |

Section 2.1

1. 1. {0, 1}
   2. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11}
   3. {1, 4, 9, 16, 25, 36, 49, 64, 81}
   4. { }
2. 1. { x | x is a real number that is a factor of 3 between 0 and 12, inclusive }
   2. { x | x is an integer that is between -3 and 3, inclusive }
3. B is a subset of A. C is a subset of A and D.
4. 1. { { }, {a} }
   2. { { }, {a}, {b}, {a, b} }
5. A x B
   1. { (a, y), (b, y), (c, y), (d, y), (a, z), (b, z), (c,z), (d,z) }

Section 2.2

1. 1. {0, 1, 2, 3, 4, 5, 6}
   2. {3}
   3. {1, 2, 4, 5}
   4. {0, 6}