

*Include your name, the homework number, and your complete work, including any steps used to obtain the answer. Submit a hard copy - written out legibly or printed - before class.*

20 pts

Section 1.7

6. Use a direct proof to show that the product of two odd numbers is odd. (2 pt)
12. Prove or disprove that the product of a nonzero rational number and an irrational number is irrational. (2 pt)
18. Prove that if  $n$  is an integer and  $3n+2$  is even, then  $n$  is even using (4 pt)  
a) a proof by contraposition.  
b) a proof by contradiction.
24. Show that at least three of any 25 days chosen must fall in the same month of the year. (2 pt)
26. Prove that if  $n$  is a positive integer, then  $n$  is even if and only if  $7n + 4$  is even. (2 pt)

Section 1.8

4. Use a proof by cases to show that  $\min(a, \min(b, c)) = \min(\min(a, b), c)$  whenever  $a, b,$  and  $c$  are real numbers. (2 pt)
6. Prove using the notion of without loss of generality that  $5x + 5y$  is an odd integer when  $x$  and  $y$  are integers of opposite parity. (2 pt)
8. Prove that there is a positive integer that equals the sum of the positive integers not exceeding it. Is your proof constructive or nonconstructive? (2 pt)
16. Show that if  $a, b,$  and  $c$  are real numbers and  $a \neq 0,$  then there is a unique solution of the equation  $ax + b = c.$  (2 pt)