Math 270 - Basic Discrete Mathematics
Practice Quiz on Section 4.6
Solutions

Directions: Answer the problems given below.

1. Evaluate each of the following:

a. $\left\lfloor \frac{13}{5} \right\rfloor = 2$

b. $\left\lceil \frac{13}{5} \right\rceil = 3$

c. $\left\lceil -\frac{5}{2} \right\rceil = -3$

d. $\lfloor -4 \rfloor = -4$

2. Prove that for every integer n, if n is odd then $2\left\lceil \frac{n}{2} \right\rceil = n + 1$.

Proof: Let n be an arbitrary integer and suppose n is odd. Then by definition of odd, $\exists k \in \mathbb{Z}$ such that $n = 2k+1$, so $\frac{n}{2} = k + \frac{1}{2}$. Observe that $k+1 \in \mathbb{Z}$ (by closure) and $(k+1)-1 = k < k+\frac{1}{2} < k+1$, so by definition of ceiling we have $\left\lceil \frac{n}{2} \right\rceil = \left\lceil k + \frac{1}{2} \right\rceil = k+1$, and so $2\left\lceil \frac{n}{2} \right\rceil = 2k+2 = (2k+1)+1 = n+1$ as claimed! Since n was arbitrary, the proof is complete. ∎