• An open ball is

Inequalities

• We now show how the Order properties can be used to solve certain inequalities

2.1.12 Examples

a) Determine the set A of all real numbers x such that $5x+1 \leq 6$

1. Suppose $5x+1 \leq 6$. ∴ By defn 2.1.6(b), $6-(5x+1) \in P \cup \{0\}$
2. By defn. of $\cup$, $6-(5x+1) \in P$ or $6-(5x+1) \in \{0\}$
3. Let, $6-(5x+1) \in P$. ∴ By defn 2.1.6(a), $6 > 5x+1$
4. $6+(-1) > (5x+1)+(-1)$ (Thm 2.1.7(b))
5. $6 = 5+1$ (Successor func.)
6. $6+(-1) = (5+1)+(-1)$ (Substitute eq 5)
7. $(5+1)+(-1) = 5+(1+(-1))$ (A2)
8. $1+(-1) = 0$ (A4)
9. $5+(1+(-1)) = 5+0$ (Substitute eq 8)