• We conclude that $B=\{x: x\in R, x>4\}\cup\{x: x\in R, x<-1\}$

c) Determine the set $C:=\left\{x\in R: \frac{x^2+2}{2x+1}<1\right\}$

1. $\frac{x^2+2}{2x+1}<1$ (Given) 2. By Trichotomy property, exactly 1 of the following holds: $(2x+1)\in P$, $2x+1=0$, $-(2x+1)\in P$.

3. Let, $2x+1\in P$. ∴ By defn, $(2x+1)>0$.

4. $\frac{x^2+2}{2x+1}\cdot(2x+1)<1\cdot(2x+1)$ (Thm 2.1.7(c)) 5. $1\cdot(2x+1)=2x+1$ (M3)

6. $\frac{x^2+2}{2x+1}\cdot(2x+1)<2x+1$ (Substitute eq 5 in 4) 7. $\frac{x^2+2}{(2x+1)}=(x^2+2)\cdot\frac{1}{(2x+1)}$ (Defn. of division)

8. $\frac{x^2+2}{2x+1}\cdot(2x+1)=\left((x^2+2)\cdot\frac{1}{(2x+1)}\right)\cdot(2x+1)$ (Substitute eq 7)

9. $\left((x^2+2)\cdot\frac{1}{(2x+1)}\right)\cdot(2x+1)=(x^2+2)\cdot\left(\frac{1}{(2x+1)}\cdot(2x+1)\right)$ (M2)

10. ∵ Stmt 9 holds, by Trichotomy prop, $(2x+1)\neq 0$

11. $\frac{1}{(2x+1)}\cdot(2x+1)=1$ (M4) 12. $(x^2+2)\cdot\left(\frac{1}{(2x+1)}\cdot(2x+1)\right)=(x^2+2)\cdot 1$ (Substitute eq 11)

13. $(x^2+2)\cdot 1=(x^2+2)$ (M3) 14. $(x^2+2)\cdot\left(\frac{1}{(2x+1)}\cdot(2x+1)\right)=(x^2+2)$ (Transitivity of eq on 12, 13)

15. $\left((x^2+2)\cdot\frac{1}{(2x+1)}\right)\cdot(2x+1)=(x^2+2)$ (Transitivity of eq on 9, 14)

16. $\frac{x^2+2}{(2x+1)}\cdot(2x+1)=(x^2+2)$ (Transitivity of eq on 8, 15)

17. Substitute eq 16 in 6, we get: $(x^2+2)<2x+1$

18. $(x^2+2)+(-(2x+1))<(2x+1)+(-(2x+1))$ (Thm 2.1.7(b))

19. $(2x+1)+(-(2x+1))=0$ (A4) 20. $(x^2+2)+(-(2x+1))<0$ (Substitute eq 19 in 18)

21. $-(2x+1)=(-(2x))+(-1)$ (Ex 2.1, 2(a)) 22. $(x^2+2)+(-(2x+1))=(x^2+2)+\left((-2x)+(-1)\right)$

23. $(x^2+2)+((-2x)+(-1))=x^2+(2+((-2x)+(-1)))$ (Substitute eq 21) (A2)