

**640:300 WORKSHOP 11**  
**COUNTABLE OR UNCOUNTABLE?**

Decide if the following set is countable or uncountable. Prove your answer!

(a)  $\bigcup_{n \in \mathbb{N}} \left\{ \frac{\sqrt{n}}{2^k} \mid k \in \mathbb{N} \right\};$

(b)  $\mathbb{R} \times \mathbb{N};$

(c)  $\left( -\frac{\pi}{2}, \frac{\pi}{2} \right).$  (*Hint: Can you recall a well-known function in calculus with this domain and with  $\mathbb{R}$  as the range?*)