

1. $(\frac{\pi}{4}, \frac{\pi}{2}) \cup (\pi, \frac{5\pi}{4})$

2. 4

3. $(-\infty, 1)$

4. $[-\frac{5}{4}, 1]$

5. $(-\frac{2\pi}{3}, \frac{2\pi}{3}]$