$\boxed{\begin{matrix}3.80\\ k8\end{matrix}}$

$$1+i\tan\alpha = \frac{\cos\alpha + i\sin\alpha}{\cos\alpha} = \frac{\operatorname{cis}\alpha}{\cos\alpha}$$

$$1-i\tan\alpha = \frac{\cos\alpha - i\sin\alpha}{\cos\alpha} = \frac{\operatorname{cis}(-\alpha)}{\cos\alpha}$$

$$\frac{1+i\tan\alpha}{1-i\tan\alpha} = \frac{\frac{\operatorname{cis}\alpha}{\cancel{\cos\alpha}}}{\frac{\operatorname{cis}(-\alpha)}{\cancel{\cos\alpha}}} = \operatorname{cis} 2\alpha$$

בשלב הבא נציב $x = \tan\beta$ לכן $\frac{1+xi}{1-xi} = \operatorname{cis} 2\beta$

$$(\operatorname{cis}2\beta)^{10} = \operatorname{cis} 2\alpha$$

$$\operatorname{cis} 20\beta = \operatorname{cis} 2\alpha$$

$$\beta = \frac{2\alpha}{20} + \frac{2\pi k}{20} = \frac{\alpha}{10} + \frac{\pi k}{10} \qquad k = 0, 1, \dots 9$$

$$x = \tan\beta = \tan\left(\frac{\alpha}{10} + \frac{\pi k}{10}\right)$$ לכן

$\boxed{\begin{matrix}3.80\\ k9\end{matrix}}$

$$3 \geq |z-1| \to 9 > x^2 + (y-1)^2$$

$$-1 < \operatorname{Im} z \leq 2 \to -1 < y \leq 2$$

$$\frac{1}{2} \geq \operatorname{Im}\frac{1}{z} = \operatorname{Im}\left(\frac{1}{x+iy} \cdot \frac{x-iy}{x-iy}\right) = \operatorname{Im}\left(\frac{x-iy}{x^2+y^2}\right) = \frac{-y}{x^2+y^2}$$

$$x^2+y^2 \geq -2y \to x^2 + (y+1)^2 \geq 1$$