

4680

$$\alpha) \Delta = 1 - 4(\lambda - \lambda^2) = 4\lambda^2 - 4\lambda + 1 = (2\lambda - 1)^2 \geq 0$$

$$\beta) \Delta = 0 \Leftrightarrow \lambda = \frac{1}{2}$$

$$\gamma) 0 < |x_1 - x_2| < 2 \Leftrightarrow \begin{cases} 0 < |x_1 - x_2| & \textcircled{1} \\ |x_1 - x_2| < 2 & \textcircled{2} \end{cases}$$

$$\textcircled{1} \Leftrightarrow x_1 \neq x_2 \Leftrightarrow \lambda \neq \frac{1}{2}$$

$$\textcircled{2} \Leftrightarrow \left| \frac{1+2\lambda-1}{2} - \frac{1-2\lambda+1}{2} \right| < 2$$

$$\Leftrightarrow \left| \lambda - \frac{2(1-\lambda)}{2} \right| < 2 \Leftrightarrow |\lambda - 1 + \lambda| < 2$$

$$\Leftrightarrow |2\lambda - 1| < 2 \Leftrightarrow -2 < 2\lambda - 1 < 2$$

$$-1 < 2\lambda < 3 \Leftrightarrow \boxed{-\frac{1}{2} < \lambda < \frac{3}{2}}$$

$$\lambda \in \left(-\frac{1}{2}, \frac{3}{2}\right) - \left\{\frac{1}{2}\right\}$$