(1) $\lambda x + y = \lambda^2$

$x + \lambda y = 1$

$\frac{a_1}{a_2} = \frac{\lambda}{1}, \quad \frac{b_1}{b_2} = \frac{1}{\lambda}, \quad \frac{c_1}{c_2} = \frac{\lambda^2}{1}$

For no solution

$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

$\frac{\lambda}{1} = \frac{1}{\lambda} \neq \frac{\lambda^2}{1}$

$\frac{\lambda}{1} = \frac{1}{\lambda}$

$\Rightarrow \lambda^2 = 1$

$\Rightarrow \lambda = \pm 1$

using $\lambda = 1$

$\frac{a_1}{a_2} = \frac{1}{1}$

$\frac{b_1}{b_2} = \frac{1}{1}$

$\frac{c_1}{c_2} = \frac{1}{1}$

$\therefore \frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

rejected

$\lambda = -1$

$\frac{a_1}{a_2} = -1$

$\frac{b_1}{b_2} = -1$

$\frac{c_1}{c_2} = 1$

$\therefore \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

$\Rightarrow \boxed{\lambda = -1}$

For in. Many solutions

$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

$\frac{\lambda}{1} = \frac{1}{\lambda} = \frac{\lambda^2}{1}$

$\frac{\lambda}{1} = \frac{1}{\lambda}$

$\Rightarrow \lambda^2 = 1$

$\Rightarrow \lambda = \pm 1$

$\frac{1}{\lambda} = \frac{\lambda^2}{1}$

$\Rightarrow \lambda^3 = 1$

$\Rightarrow \lambda = 1$

$\boxed{\therefore \lambda = 1}$

For unique solution

$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

$\frac{\lambda}{1} \neq \frac{1}{\lambda}$

$\Rightarrow \lambda^2 \neq 1$

$\Rightarrow \lambda \neq \pm 1$

any real value except ± 1