

$$(x - \alpha)(x - \beta)(x - \gamma) = 0$$

$$\Leftrightarrow x^3 - (\alpha + \beta + \gamma)x^2 + (\alpha\beta + \beta\gamma + \gamma\alpha)x - \alpha\beta\gamma$$

$$x^3 + 3x^2 - 4x + 2 = 0 \text{ の解を } \alpha, \beta, \gamma \text{ とする}$$

上記より、解と係数の関係は以下のようなになる

$$\begin{cases} \alpha + \beta + \gamma = -3 \\ \alpha\beta + \beta\gamma + \gamma\alpha = -4 \\ \alpha\beta\gamma = -2 \end{cases}$$

(1)  $\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma}$  の値

$$\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma} = \frac{\beta\gamma + \gamma\alpha + \alpha\beta}{\alpha\beta\gamma} = \frac{-4}{-2} = 2$$

(2)  $\frac{1}{\alpha^2} + \frac{1}{\beta^2} + \frac{1}{\gamma^2}$  の値

$$\frac{1}{\alpha^2} + \frac{1}{\beta^2} + \frac{1}{\gamma^2} = \frac{\beta^2\gamma^2 + \gamma^2\alpha^2 + \alpha^2\beta^2}{\alpha^2\beta^2\gamma^2}$$

$$= \frac{(\alpha\beta + \beta\gamma + \gamma\alpha)^2 - 2\alpha\beta\gamma(\alpha + \beta + \gamma)}{(\alpha\beta\gamma)^2} = \frac{(-4)^2 - 2(-2)(-3)}{(-2)^2} = 1$$