According To Primal Problem , Attached File 1, we have :

Lagrange Function :

$$L = \log r_1 + \log r_2 + \log r_3 - \lambda_1(r_1 - 2) - \lambda_2(r_2 - 2) - \lambda_3(r_3 - 2) - \lambda_4(r_2 + r_3 - 2) - \lambda_5(r_1 + r_2 + r_3 - 4)$$

Primal Variable Elimination :

$$\frac{1}{r_1} - \lambda_1 - \lambda_5 = 0$$

$$\frac{1}{r_2} - \lambda_2 - \lambda_4 - \lambda_5 = 0$$

$$\frac{1}{r_3} - \lambda_3 - \lambda_4 - \lambda_5 = 0$$

Dual Problem :

$$Min \quad \log\frac{1}{\lambda_1 + \lambda_5} + \log\frac{1}{\lambda_2 + \lambda_4 + \lambda_5} + \log\frac{1}{\lambda_3 + \lambda_4 + \lambda_5} + 2\lambda_1 + 2\lambda_2 + 2\lambda_3 + 2\lambda_4 + 4\lambda_5 - 8$$