

- 22.** Let the numbers be x and y , where $x \geq 0$, $y \geq 0$, and $x + y = 8$. If S is the sum of their squares then

$$\begin{aligned} S &= x^2 + y^2 = x^2 + (8 - x)^2 \\ &= 2x^2 - 16x + 64 = 2(x - 4)^2 + 32. \end{aligned}$$

Since $0 \leq x \leq 8$, the maximum value of S occurs at $x = 0$ or $x = 8$, and is 64. The minimum value occurs at $x = 4$ and is 32.