

Problem Sheet 2

The following problems involve equations and inequalities.

1. Find the smallest integer solution to the following equation:

$$\frac{1}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$$

2. Given that $u > 0$ and $v > 0$ what is the smallest possible value of $1/u + 1/v$ given that $u + v = 5$?
3. Find the range of values of x for which

$$\sqrt{x} + \frac{1}{\sqrt{x}} < 4,$$

where $\sqrt{x}$ is the positive root.

4. If $0 < x < 1$ and $0 < y < 1$ then prove

$$x + y < 1 + xy$$

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5. Is the mean of the squares of two numbers greater than, or less than, the square of their means?
 6. Find all positive integers x , y and z such that:

$$x + \frac{1}{y + \frac{1}{z}} = \frac{10}{7}$$