

Denote the numbers by letter symbols, say x, y, z and w .
Write the system of 4 equations

$$\frac{x + y + z}{3} + w = 29, \quad \frac{w + y + z}{3} + x = 23,$$

$$\frac{x + w + z}{3} + y = 21, \quad \frac{x + y + w}{3} + z = 17$$

Observe that the system is symmetric, i.e. if one applies a permutation to the symbols x, y, z , and w one obtains the same 4 numbers after solving it. Solve the system by either substitution, reduction or Cramer's rule to get the numbers 12, 9, 3, and 21.

Any alternative, correct solution earns full credit.