

# ROMANIAN MATHEMATICAL MAGAZINE

Solve for real numbers:

$$\begin{cases} x(y+z) = 35 \\ y(x+z) = 35 \\ z(x+y) = 27 \end{cases}$$

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$$x(y+z) = 35 \quad (1), \quad y(x+z) = 35 \quad (2), \quad z(x+y) = 27 \quad (3)$$

*From (1)&(2) we get  $x(y+z) = y(x+z)$  or  $z(x-y) = 0 \Rightarrow z = 0$  or  $x = y$*

*If  $z = 0$  then from (3) we get  $0 = 27$ , not possible so  $z \neq 0$*

*If  $x = y = m$  (say) then from (3) we have  $z \cdot (2m) = 27$  or,  $z = \frac{27}{2m}$*

*From (1):  $m(m+z) = 35$  or,  $m\left(m + \frac{27}{2m}\right) = 35$  or  $m^2 = \frac{43}{2}$  or*

$$m = \pm \sqrt{\frac{43}{2}}, z = \frac{27}{2m} = \pm \frac{27}{\sqrt{86}}$$

*So required solutions:  $x = \sqrt{\frac{43}{2}}, y = \sqrt{\frac{43}{2}}, z = \frac{27}{\sqrt{86}}$  and*

$$x = -\sqrt{\frac{43}{2}}, y = -\sqrt{\frac{43}{2}}, z = -\frac{27}{\sqrt{86}}$$