Show that $X^4Y^2Z^2 + X^2Y^4Z^2 + X^2Y^2Z^4 - 4X^2Y^2Z^2 + 1 \geq 0$ for all $X, Y, Z \in \mathbb{R}^3$.

Please submit your solution to:

- Dr. Tirtha Timsina, ttimsina@gsu.edu
- Dr. Christian Avart, cavart@gsu.edu

before the deadline: April 28th, 7:00PM. The WINNER will be awarded with a \$15 gift certificate and will be announced in the NEXT issue.

Solution to the March Problem of the Month: Since the set S is finite, there are only finitely maps from S to S and consequently, there must be $i > j$ such that $f^i = f^j$. Writing $j - i = k$, we have $f^i = f^{i+k}$. Consequently $f^{i+n} = f^{i+n+k}$ for every $n \geq 0$. In particular choosing n to be solution of $i + n = ai$, we also have $f^{ai} = f^{ai+k}$ for any $a > 0$. Finally, notice that for any integer $b > 0$, we have $f^{ai} = f^{ai+k} = f^{ai+2k} = \cdots = f^{ai+bk}$. Now choosing $a = k$ and $b = i$ we obtain $f^{ki} = f^{ki+ik}$ or $f^{ki} = f^{2ki} = (f^{ki})^2$, concluding the proof.

Winner: Joseph Moravitz.