09USATST7

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§1 Solution

Solution. I claim the answer is $(x, y, z) = (2, 4, 6)$ only. Assume

$$x > 2 \implies z^3 - 27z > 54 \implies z > 6 \implies y^3 - 12y > 16$$

$$\implies y > 4 \implies x^3 - 3x < 2 \implies x < 2$$

Similarly if we assume $x < 2$ we get $x > 2$. Therefore, $x = 2$. But that means $(x, y, z) = (2, 4, 6)$ is the only solution. So we are done. □