Firstly, a satisfies $18|a$, Otherwise, if a is not a multiple of 2 and 9, $\frac{2a^2}{3}$ can't be a cubic number; moreover, *b* satisfies 6|*b*, Otherwise, if *b* is not a multiple of 2 and 3, $\frac{3b^3}{2}$ can't be a square number.

Secondly, let $a = 18c$ and $b = 6d$, we have:

$$2a^2 = 3b^3 \Longrightarrow 2 \cdot (18c)^2 = 3 \cdot (6d)^3 \Longrightarrow c^2 = d^3$$

Finally, each prime factor of *c* must be a cubic number, otherwise if prime number $e|c$ while $e^3 \nmid c$, then c^2 can't be a cubic number; moreover, each prime factor of d must be a square number, otherwise if prime number $e|d$ while $e^2 \nmid c$, then d^3 can't be a cubic number. Thus c and d can be represented as:

$$\mathrm{c} = t^3, d = t^2,$$

while *t* is a positive integer.

Therefore, we figure out that $a = f(t) = 18 \cdot t^3$, and $a = g(t) = 6 \cdot t^2$