$AM > GM, 4ax^2, 1/x8ax^2 + 2/x >= 2, 8ax \cdot 1/x, 1/xAM >= GM(8ax^2 + 1/x + 1/x)/3 >= ((8ax^2)(1/x)(1/x))^1/3, (8ax^2 + 2/x)/3 >= (8a)^1/3, (8ax^2 + 2/x)/3 >= 2(a)^1/3, 4ax^2 + 1/x >= 3(a)^1/3$, when comparing the above equation with the given question $1, a^1/3 = 1/3, Hence, a = 1/27$.