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by parmenides51

1 Find all positive integers a, b, c, such that $(8a-5b)^2+(3b-2c)^2+(3c-7a)^2=2$.

2 ABC is a triangle. Show that $c \geq (a+b)\sin\frac{C}{2}$

3 A cube side 5 is made up of unit cubes. Two small cubes are *adjacent* if they have a common face. Can we start at a cube adjacent to a corner cube and move through all the cubes just once? (The path must always move from a cube to an adjacent cube).

4 $ABCD$ is a quadrilateral with $\angle A = 90o$, $AD = a$, $BC = b$, $AB = h$, and area $\frac{(a+b)h}{2}$. What can we say about $\angle B$?

5 Show that for any $n > 5$ we can find positive integers $x_1, x_2, ..., x_n$ such that $\frac{1}{x_1}+\frac{1}{x_2}+...+\frac{1}{x_n}=\frac{1997}{1998}$. Show that in any such equation there must be two of the n numbers with a common divisor (> 1).

6 Show that for some $c > 0$, we have $\left|\sqrt[3]{2}-\frac{m}{n}\right| > \frac{c}{n^3}$ for all integers m, n with $n \geq 1$.