PoTW 1: Week of 5-27-2021

Problem of the Week at shsmathteam.com

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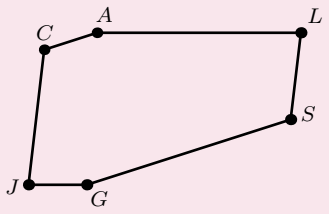
Problem of the Week #1: Vexing Hexagon

Topic: Geometry

Hexagon $ALSGJC$ has the curious property that all of its opposite sides are parallel; that is, $\overline{AL} \parallel \overline{GJ}$, $\overline{LS} \parallel \overline{JC}$, and $\overline{SG} \parallel \overline{CA}$. Suppose that $\overline{AL} = 21\sqrt{2}$, $\overline{LS} = 9\sqrt{3}$, $\overline{SG} = 18\sqrt{3}$, $\overline{GJ} = 9\sqrt{2}$, $\overline{JC} = 14\sqrt{3}$, and $\overline{CA} = 7\sqrt{3}$. If R is the length of the circumradius of $\triangle ASJ$, compute $(R^2 - 378)$.



Helpful hint: Power of a Point. The accuracy of the diagram isn't too important.