Graphene has been demonstrated to be a promising photodetection material because of its ultrabroadband optical absorption, compatibility with CMOS technology, and dynamic tunability in optical and electrical properties. However, being a single atomic layer thick, graphene has intrinsically small optical absorption, which hinders its incorporation with modern photodetecting systems. In this work, we propose a gold snowflake-like fractal metasurface design to realize broadband and polarization-insensitive plasmonic enhancement in graphene photodetector. We experimentally obtain an enhanced photovoltage from the fractal metasurface that is an order of magnitude greater than that generated at a plain gold-graphene edge and such an enhancement in the photovoltage sustains over the entire visible spectrum. We also observed a relatively constant photoresponse with respect to polarization angles of incident light, as a result of the combination of two orthogonally oriented concentric hexagonal fractal geometries in one metasurface.