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An angular-asymmetric binary branching tree is a fractal tree with two distinct branching angles: θ_1 and θ_2 . The properties of these trees are explored. In particular, a method for calculating the maximal height of an angular-asymmetric binary branching tree is developed using θ_1 and θ_2 as well as a scaling ratio r as parameters. The result is proved by induction on the n -th level canopy of the fractal tree and results in an efficient analytic method for calculating maximal tree height for the case $\theta_1 = n\theta_2$ where $n \in \mathbb{Z}^+$. (Received September 21, 2007)