17. A solid cube is divided into two pieces by a single rectangular cut. As a result, the total surface area increases by a fraction f of the surface area of the original cube. What is the greatest possible value of f?

A $\frac{1}{3}$ B $\frac{\sqrt{3}}{4}$ C $\frac{\sqrt{2}}{3}$ D $\frac{1}{2}$ E $\frac{1}{\sqrt{3}}$

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17. C The greatest possible value of f is achieved by a rectangular cut through an edge of a cube and the furthest edge from it. If we take x as the side of the cube, by Pythagoras' Theorem the extra surface area formed by the cut is $2\sqrt{2}x^2$. Hence $f = \frac{2\sqrt{2}x^2}{6x^2} = \frac{\sqrt{2}}{3}$.