PROBLEM

Increase the dimensions of a square with side x_1 to a square with side length x_2. The change in the area of the square ΔA is approximated by the differential dA. In this example, dA is

(a) $(x_2 - x_1)2x_1$

(b) $(x_2 - x_1)2x_2$

(c) $x_2^2 - x_1^2$

(d) $(x_2 - x_1)^2$

FOLLOW UP (SEE PREVIOUS PROBLEM)

If you estimate the change in the area of the square ΔA by the differential dA, this will result in an

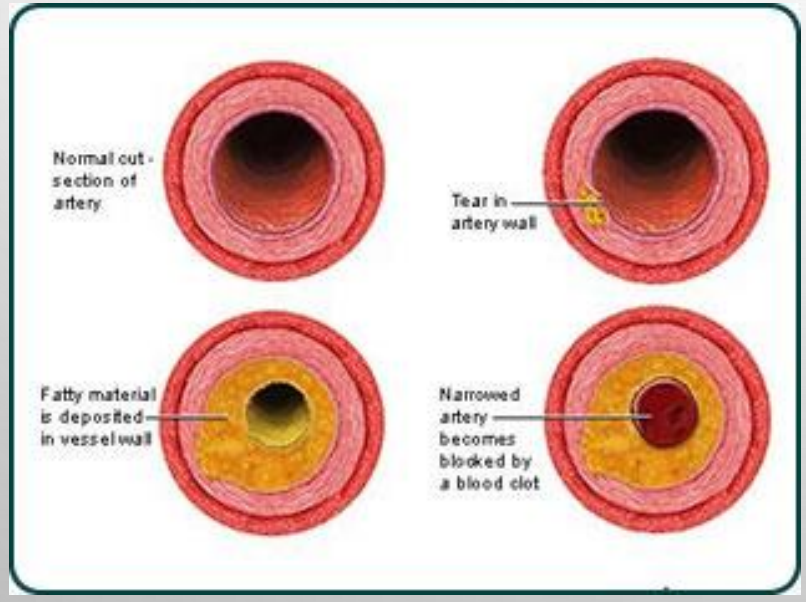
(a) overestimate.

(b) underestimate.

(c) neither, since $\Delta A = dA$.

PROBLEM

Poiseuille's Law for blood flow states that the volume flowing through an artery is proportional to the fourth power of the radius, i.e., $V = kR^4$. By how much must the radius increase in order to increase blood flow by 50%?



Source: http://www.cdc.gov/heartdisease/images/hd_cholesterol_illustration_02.jpg