1135-26-1486 **Jun Tao*** (jtao68@yahoo.com), 14207 Eagle Mine Dr, Poway, CA 92064. *Proof of the Formula for Arc Length in a New Way.*

We approximate the length of a curve using tangent lines that touch the curve at an arbitrary point and get the approximation formula $L \approx \sum_{i=1}^{n} \sqrt{1+[f'(x_i^*)]^2}\triangle x$, where x_i^* represents an arbitrary point in the ith subinterval. Then we prove $L = \lim_{n\to\infty} \sum_{i=1}^{n} \sqrt{1+[f'(x_i^*)]^2}\triangle x$. Since x_i^* is an arbitrary point, the proved formula fully satisfies the requirement of the definition of a definite integral and can be converted into the formula $L = \int_a^b \sqrt{1+[f'(x)]^2}dx$. $L = \lim_{n\to\infty} \sum_{i=1}^{n} \sqrt{1+[f'(x_i^*)]^2}\triangle x$ is a generic formula and covers the formula $L = \lim_{n\to\infty} \sum_{i=1}^{n} \sqrt{1+[f'(x_i^c)]^2}\triangle x$, where x_i^c represents a certain point, derived by approximating the length of a curve using secant lines. (Received September 22, 2017)