

### Question 19210

Linearization of function at given point is the best linear approximation of this function. In geometric sense, this is approximation of function by a slope at given point. In terms of Taylor series, this is the expansion at given point, to terms of power of 1.

The general formula for Taylor expansion at point  $a$  is:  $f(x) = f(a) + \sum_{k=1}^{\infty} f^{(k)}|_{x=a} \cdot (x-a)^k$  .

$f^{(k)}$  denotes the  $k$ -th derivative, and  $|_{x=a}$  denotes that this derivative is taken at point  $a$ .

Hence,  $f(x) = \sqrt[3]{1+x}$ ,  $a=0$  :

$$L(x) = 1 + \frac{1}{3(1+x)^{2/3}}|_{x=0} \cdot x = 1 + \frac{x}{3} .$$

$$\sqrt[3]{0.95} = 1 - \frac{0.05}{3} = 0.983 .$$

$$\sqrt[3]{1.1} = 1 + \frac{0.1}{3} = 1.033 .$$