

### Question 19193

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,

$$f(x) = \frac{1}{(1+2x)^4}, a=0:$$

$$L(x) = f(0) - \frac{8}{(1+2x)^5}|_{x=0} \cdot (x-0) = 1 - 8x .$$