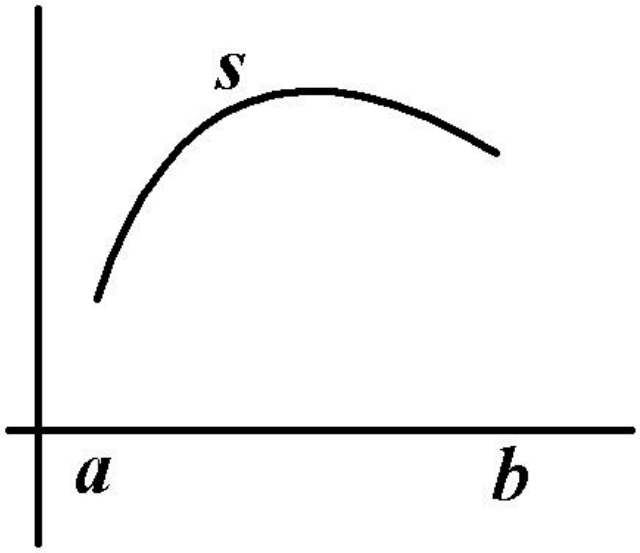
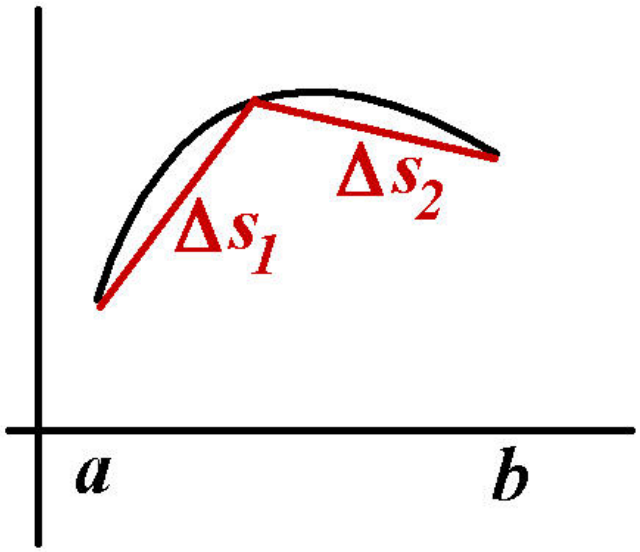
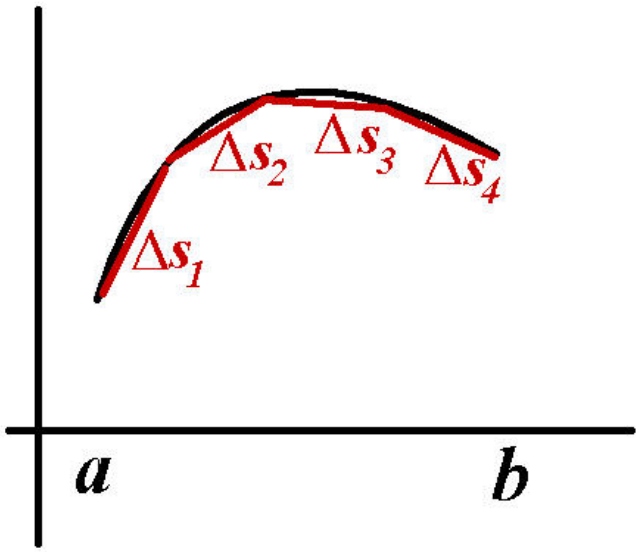
Let s be the length of a segment of a curve



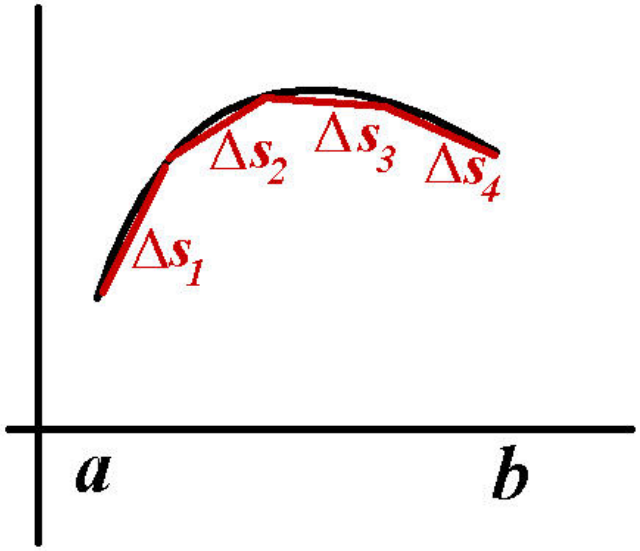
$$s \approx \Delta s_1 + \Delta s_2$$



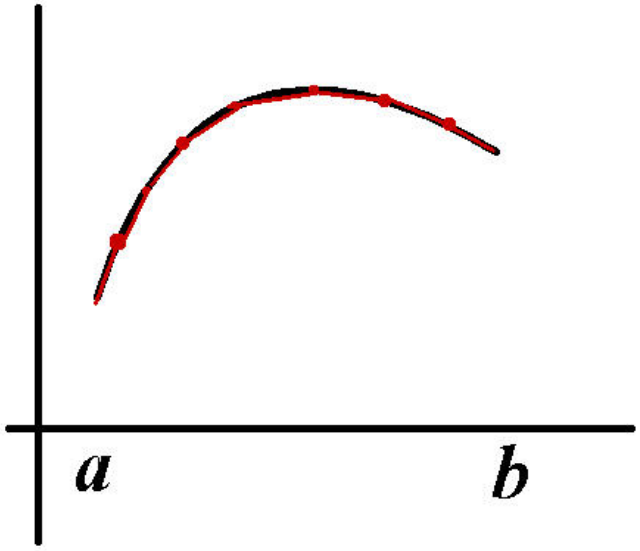
$$s \approx \Delta s_1 + \Delta s_2 + \Delta s_3 + \Delta s_4$$



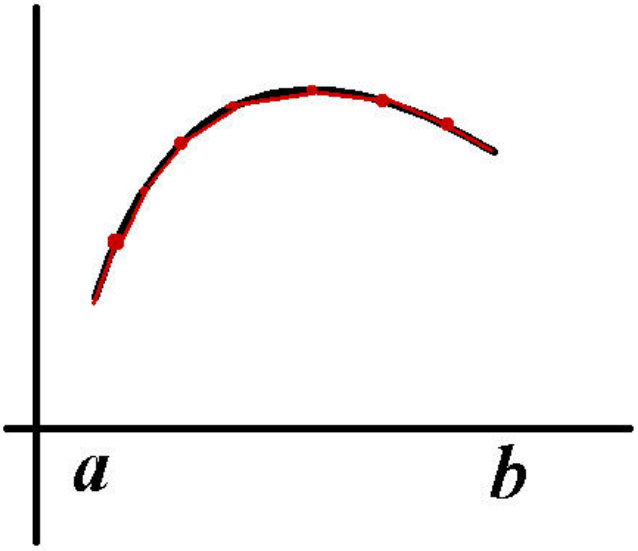
$$s \approx \Delta s_1 + \Delta s_2 + \Delta s_3 + \Delta s_4 = \sum_{i=1}^{4} \Delta s_i$$



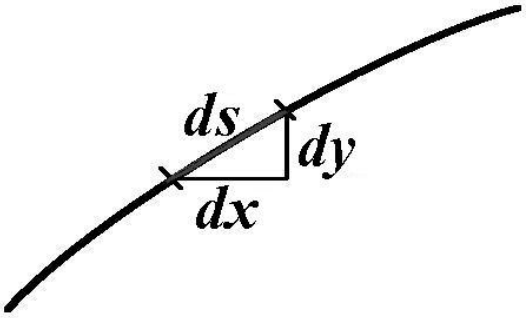
$$s \approx \sum_{i=1}^{N} \Delta s_i$$



$$s = \lim_{N \to \infty} \sum_{i=1}^{N} \Delta s_i$$



ds is the length of a small segment of a curve



$$(ds)^2 = (dx)^2 + (dy)^2$$

$$(ds)^2 = (dx)^2 + (dy)^2$$

$$(ds)^2 = \left(1 + \left(\frac{dy}{dx}\right)^2\right)(dx)^2$$

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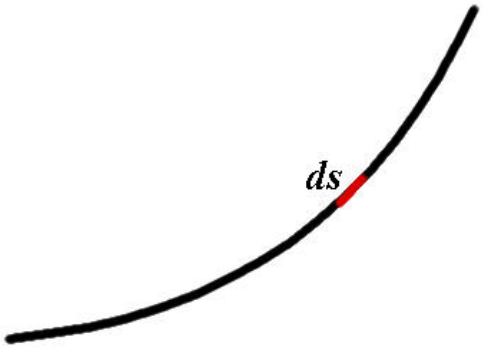
$$(ds)^2 = \left(1 + \left(\frac{dy}{dx}\right)^2\right)(dx)^2$$

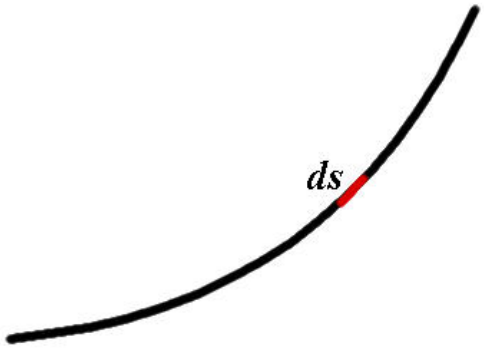
$$ds = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}\, dx$$

The total arclength is the limit of the sum of the small arclength segments.



$$s = \int ds$$

The total arclength is the limit of the sum of the small arclength segments.



$$s = \int_a^b \sqrt{1 + \left(\frac{dy}{dx}\right)^2}\, dx$$