33534:

Task.

Find the arclength of y=3x^(3/2) on 1<x<2< span=""></x<2<>

Solution. From $y = 3x^{3/2}$ we find $\frac{dy}{dx} = \frac{9\sqrt{x}}{2}$. The length *s* of the part of the graph of *y* between *x = 1* and *x = 2* can be found as follows:

$$s = \int\limits_{1}^{2} \sqrt{1 + (\frac{dy}{dx})^2}\, dx = \int\limits_{1}^{2} \sqrt{1 + \frac{81x}{4}}\, dx$$

$$= \frac{4}{81} * \frac{2}{3}\left(1 + \frac{81*2}{4}\right)^{\frac{3}{2}} - \frac{4}{81} * \frac{2}{3}\left(1 + \frac{81*1}{4}\right)^{\frac{3}{2}} \approx 5.57654$$

Answer: 5.57654.