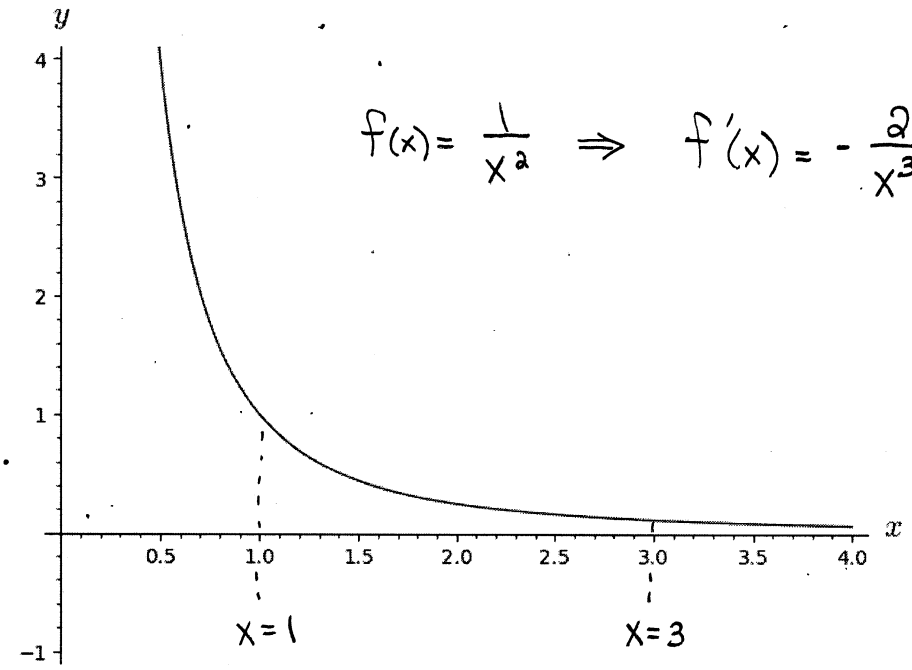
Example

Find the length of the graph of $y = \frac{1}{x^2}$ over the interval from $x = 1$ to $x = 3$. Use technology to evaluate your definite integral.

Solution



$$f(x) = \frac{1}{x^2} \Rightarrow f'(x) = -\frac{2}{x^3}$$

$$\text{Arc length} = \int_1^3 \sqrt{1 + \left(-\frac{2}{x^3}\right)^2}\, dx$$

$$= \int_1^3 \sqrt{1 + \frac{4}{x^6}}\, dx$$

On your TI-83/84...

$$\text{fnInt}\left(\sqrt{(1+4/X\text{^}6)}, X, 1, 3\right) \approx 2.3075$$

Using Sage...

$$\text{numerical\_integral}\left(\text{sqrt}(1+4/X\text{^}6), 1, 3\right) \approx 2.3075$$