Examples in README:

$$\lim_{x\to+0} x\ln(\sin x) = \lim_{x\to+0}\frac{\ln(\sin x)}{x^{-1}} = \lim_{x\to+0}\frac{x}{\sin x}\cos x = 0$$

$$\sum_{n=0}^{\infty}\frac{1}{\sqrt{n+1}} = \sum_{n=0}^{\infty}\frac{1}{\sqrt{n}} = \sum_{n=0}^{\infty}\frac{1}{n^{\frac{1}{2}}}$$

$$\int_0^{\frac{\pi}{3}}\sqrt{1+\tan^2 x}\,\mathrm{d}x = \int_0^{\frac{\pi}{3}}\frac{1}{\cos x}\,\mathrm{d}x = \left[\ln\frac{\cos\frac{x}{2}+\sin\frac{x}{2}}{\cos\frac{x}{2}-\sin\frac{x}{2}}\right]_0^{\frac{\pi}{3}} = \ln\left(2+\sqrt{3}\right)$$

Calculate the area of the region bounded by the curves $y = e^{\frac{x}{2}}\sin\frac{\sqrt{3}}{2}x$ and x axis:

$$\begin{aligned}
S &= \lim_{\alpha\to-\infty}\int_\alpha^0 e^{\frac{x}{2}}\left|\sin\frac{\sqrt{3}}{2}x\right|\mathrm{d}x \\
&= \lim_{n\to\infty}\sum_{k=0}^{n}(-1)^{k-1}\int_{-\frac{2(k+1)}{\sqrt{3}}\pi}^{-\frac{2k}{\sqrt{3}}\pi} e^{\frac{x}{2}}\sin\frac{\sqrt{3}}{2}x\,\mathrm{d}x \\
&= \lim_{n\to\infty}\sum_{k=0}^{n}(-1)^{k-1}\left[e^{\frac{x}{2}}\sin\left(\frac{\sqrt{3}}{2}x-\frac{\pi}{3}\right)\right]_{-\frac{2(k+1)}{\sqrt{3}}\pi}^{-\frac{2k}{\sqrt{3}}\pi} \\
&= \frac{\sqrt{3}}{2}\lim_{n\to\infty}\sum_{k=0}^{n}\left(e^{-\frac{k}{\sqrt{3}}\pi}+e^{-\frac{k+1}{\sqrt{3}}\pi}\right) = \frac{\sqrt{3}}{2}\lim_{n\to\infty}\sum_{k=0}^{n}\left(1+e^{-\frac{\pi}{\sqrt{3}}}\right)e^{-\frac{k}{\sqrt{3}}\pi} \\
&= \frac{\sqrt{3}}{2}\lim_{n\to\infty}\left(1+e^{-\frac{\pi}{\sqrt{3}}}\right)\frac{1-\left(e^{-\frac{\pi}{\sqrt{3}}}\right)^n}{1-e^{-\frac{\pi}{\sqrt{3}}}} = \frac{\sqrt{3}}{2}
\end{aligned}$$

Calculate the surface area of an ellipse:

$$\begin{aligned}
S &= 2\pi\int_{-a}^{a}|y|\sqrt{1-(|y|')^2}\,\mathrm{d}x \\
&= 2\pi\int_{-a}^{a}\frac{b}{a}\cancel{\sqrt{a^2-x^2}}\sqrt{\frac{a^4-(a^2-b^2)x^2}{a^2\cancel{a^2-x^2}}}\,\mathrm{d}x \\
&= 2\pi\int_{-a}^{a}\frac{b}{a}\sqrt{a^2-\frac{a^2-b^2}{a^2}x^2}\,\mathrm{d}x \\
&= 4\pi b\int_0^a\sqrt{1-\frac{e^2}{a^2}x^2}\,\mathrm{d}x \quad \left(e^2 = \frac{a^2-b^2}{a^2}\right) \\
&= 4\pi\frac{ab}{e}\int_0^{\arcsin e}\sqrt{1-\sin^2\theta}\cos\theta\,\mathrm{d}\theta \quad \left(\theta = \arcsin\frac{e}{a}x\right) \\
&= 4\pi\frac{ab}{e}\int_0^{\arcsin e}\cos^2\theta\,\mathrm{d}\theta = 2\pi\frac{ab}{e}\int_0^{\arcsin e}1+\cos 2\theta\,\mathrm{d}\theta \\
&= 2\pi\frac{ab}{e}\left[\theta+\frac{1}{2}\sin 2\theta\right]_0^{\arcsin e} = 2\pi\frac{ab}{e}\left[\theta+\sin\theta\sqrt{1-\sin^2\theta}\right]_0^{\arcsin e} \\
&= 2\pi\frac{ab}{e}\left(\arcsin e+e\sqrt{1-e^2}\right)
\end{aligned}$$