# Exercise 4

Differentiate.

$$y = 2\sec x - \csc x$$

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**Solution**

Use the quotient rule to differentiate $y$.

$$\begin{aligned}
y' &= \frac{dy}{dx} \\
&= \frac{d}{dx}(2\sec x - \csc x) \\
&= \frac{d}{dx}(2\sec x) - \frac{d}{dx}(\csc x) \\
&= \frac{d}{dx}\left(\frac{2}{\cos x}\right) - \frac{d}{dx}\left(\frac{1}{\sin x}\right) \\
&= \frac{\left[\frac{d}{dx}(2)\right]\cos x - \left[\frac{d}{dx}(\cos x)\right](2)}{(\cos x)^2} - \frac{\left[\frac{d}{dx}(1)\right]\sin x - \left[\frac{d}{dx}(\sin x)\right](1)}{(\sin x)^2} \\
&= \frac{(0)\cos x - (-\sin x)(2)}{\cos^2 x} - \frac{(0)\sin x - (\cos x)(1)}{\sin^2 x} \\
&= \frac{2\sin x}{\cos^2 x} + \frac{\cos x}{\sin^2 x}
\end{aligned}$$