

ex: $\csc\theta - \cot\theta = \frac{\sin\theta}{1+\cos\theta}$

$$\begin{aligned} \csc\theta - \cot\theta &= \frac{1}{\sin\theta} - \frac{\cos\theta}{\sin\theta} \leftarrow \\ &= \frac{(1-\cos\theta)}{\sin\theta} \cdot \frac{(1+\cos\theta)}{(1+\cos\theta)} \\ &= \frac{1-\cos^2\theta}{\sin\theta(1+\cos\theta)} \\ &= \frac{\sin^2\theta}{\sin\theta(1+\cos\theta)} \\ &= \frac{\sin\theta}{1+\cos\theta} \end{aligned}$$

$a+b$ is the conjugate of $a-b$

$$\frac{x^2}{x(1+y)}$$

ex: $\frac{\sec\theta}{\csc\theta} + \frac{\sin\theta}{\cos\theta} = 2\tan\theta$

$$\begin{aligned} \frac{\sec\theta}{\csc\theta} + \frac{\sin\theta}{\cos\theta} &= \frac{\frac{1}{\cos\theta}}{\frac{1}{\sin\theta}} + \tan\theta \\ &= \frac{1}{\cos\theta} \cdot \frac{\sin\theta}{1} + \tan\theta \\ &= \frac{\sin\theta}{\cos\theta} + \tan\theta \\ &\Rightarrow \tan\theta + \tan\theta \\ &= 2\tan\theta \end{aligned}$$

$$24) \quad 1 - \frac{\sin^2 \theta}{1 - \cos \theta} = -\cos \theta$$

$$1 - \frac{\sin^2 \theta}{1 - \cos \theta} = 1 - \frac{1 - \cos^2 \theta}{1 - \cos \theta}$$

$$A^2 - B^2 = (A+B)(A-B)$$

$$= 1 - \frac{(1 + \cos \theta)(\cancel{1 - \cos \theta})}{\cancel{1 - \cos \theta}}$$

$$= 1 - 1 - \cos \theta$$

$$= -\cos \theta$$

p481 19, 21, 23, 31, 39, 56, 57

$$3\sin^2 \theta + 4\cos^2 \theta = 3\sin^2 \theta + 3\cos^2 \theta + \cos^2 \theta$$

$$= 3 + \cos^2 \theta$$