

$$\rightarrow \tan(x+y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$$

$$\tan(x-y) = \frac{\tan x - \tan y}{1 + \tan x \tan y}$$

$$\rightarrow \tan(2x) = \frac{2 \tan x}{1 - \tan^2 x}, \quad 2x \neq \text{odd multiple of } \frac{\pi}{2}$$

$$\tan(3x) = \frac{3 \tan x - \tan^3 x}{1 - 3 \tan^2 x}$$

$$3x \neq \text{odd multiple of } \frac{\pi}{2}$$

$$\rightarrow \cot(x+y) = \frac{\cot x \cot y - 1}{\cot x + \cot y}$$

$$\cot(x-y) = \frac{1 + \cot x \cot y}{\cot y - \cot x}$$

$$\rightarrow \cot(2x) = \frac{\cot^2 x - 1}{2 \cot x}$$

$$\rightarrow \cot(3x) = \frac{\cot^3 x - 3 \cot x}{3 \cot^2 x - 1}$$