

$$5. \sin(\underbrace{6\theta}_\alpha) + \sin(\underbrace{2\theta}_\beta)$$

$$\sin \alpha + \sin \beta = 2 \sin \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2}$$

$$= 2 \sin \frac{6\theta + 2\theta}{2} \cos \frac{6\theta - 2\theta}{2}$$

$$= \boxed{2 \sin(4\theta) \cos(2\theta)}$$

$$6. \textcircled{6} \cos \underbrace{3X}_\alpha + \cos \underbrace{X}_\beta = \cot X$$

$$\textcircled{5} \frac{\sin 3X - \sin X}{\cos 3X + \cos X}$$

$$\cancel{2} \cos \frac{3X+X}{2} \cos \frac{3X-X}{2}$$

$$\cancel{2} \sin \frac{3X-X}{2} \cos \frac{3X+X}{2}$$

$$\frac{\cos X}{\sin X}$$

$$\cot X$$

$$\cot X \quad \checkmark$$