

# Final Review

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

$$\frac{(2\sin \theta \cos \theta)^2}{2\cos^2 \theta} = \frac{2}{\csc^2 \theta}$$

$$\frac{4\sin^2 \theta \cos^2 \theta}{2\cos^2 \theta} = \frac{2}{\frac{1}{\sin^2 \theta}}$$

$$2\sin^2 \theta = 2\sin^2 \theta$$

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

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

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

$$\frac{2\sin^2 \theta}{\sin^2 \theta} = 2$$

$$\textcircled{3} \sin(x+y)(\sin x - y) = \cos^2 y - \cos^2 x$$

$$(\sin x \cos y + \cos x \sin y)(\sin x \cos y - \cos x \sin y) = \cos^2 y - \cos^2 x$$

$$\sin^2 x \cos^2 y - \cos^2 x \sin^2 y = \cos^2 y - \cos^2 x$$

$$(1 - \cos^2 x) \cos^2 y - \cos^2 x (1 - \cos^2 y) = \cos^2 y - \cos^2 x$$

$$\cos^2 y - \cos^2 x \cos^2 y - \cos^2 x + \cos^2 x \cos^2 y = \cos^2 y - \cos^2 x$$

$$\textcircled{4} \cos^4 \theta = 1 - 2\sin^2 \theta + \sin^4 \theta$$

$$\cos^4 \theta = (1 - \sin^2 \theta)(1 - \sin^2 \theta)$$

$$\cos^4 \theta = (\cos^2 \theta)(\cos^2 \theta)$$

$$\cos^4 \theta = \cos^4 \theta$$

$$\textcircled{5} \tan^4 \theta = \sec^4 \theta (1 - 2\cos^2 \theta + \cos^4 \theta)$$

$$\frac{\sin^4 \theta}{\cos^4 \theta} = \frac{1}{\cos^4 \theta} (1 - \cos^2 \theta)(1 - \cos^2 \theta)$$

$$\frac{\sin^4 \theta}{\cos^4 \theta} = \frac{1 \cdot \sin^2 \theta \cdot \sin^2 \theta}{\cos^4 \theta}$$

$$\textcircled{6} \tan \theta = \frac{1 + \sin \theta - \cos^2 \theta}{\cos \theta (1 + \sin \theta)}$$

$$\frac{\sin \theta}{\cos \theta} = \frac{\sin \theta + \sin^2 \theta}{\cos \theta (1 + \sin \theta)}$$

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

$$\textcircled{7} \frac{\cos \theta}{1 + \sin \theta} + \frac{1 + \sin \theta}{\cos \theta} = 2 \sec \theta$$

$$\textcircled{8} \frac{\cos x}{\sec x - 1} - \frac{\cos x}{\tan^2 x} = \cot^2 x$$

$$\frac{\cos^2 \theta + 1 + 2 \sin \theta + \sin^2 \theta}{\cos \theta (1 + \sin \theta)} = 2 \sec \theta$$

$$\frac{\cos x \tan^2 x - (\cos x (\sec x - 1))}{\tan^2 x (\sec x - 1)} = \cot^2 x$$

$$\frac{2 + 2 \sin \theta}{\cos \theta (1 + \sin \theta)} = 2 \cdot \frac{1}{\cos \theta}$$

$$\frac{\cos x \tan^2 x - \cos x \sec x + \cos x}{\tan^2 x (\sec x - 1)} = \cot^2 x$$

$$\frac{2(1 + \sin \theta)}{\cos \theta (1 + \sin \theta)} = \frac{2}{\cos \theta}$$

$$\frac{\cos x (\tan^2 x - \sec x + 1)}{\tan^2 x (\sec x - 1)} = \cot^2 x$$

$$\textcircled{9} \cot \theta \cdot \csc \theta = \frac{\cos \theta}{1 - \cos^2 \theta}$$

$$\frac{(\cos x)(\sec^2 x - \sec x)}{\tan^2 x (\sec x - 1)} = \cot^2 x$$

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

$$\frac{(\cos x)(\sec x)(\cancel{\sec x - 1})}{\tan^2 (\cancel{\sec x - 1})} = \cot^2 x$$

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

$$\frac{1}{\tan^2 x} = \cot^2 x$$

$$\textcircled{10} \frac{\tan^2 \theta}{\tan^2 \theta + 1} = \sin^2 \theta$$

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

$$\textcircled{12} \sin(x+y) - \sin(x-y) = 2 \cos x \sin y$$

$$\cancel{\sin x \cos y} + \cos x \sin y - (\cancel{\sin x \cos y} - \cos x \sin y)$$

$$\sin^2 \theta = \sin^2 \theta$$

$$2 \cos x \sin y = 2 \cos x \sin y$$

$$\textcircled{11} \cot^2 \theta + \sec^2 \theta = \tan^2 \theta + \csc^2 \theta$$

$$\csc^2 \theta - 1 + \tan^2 \theta + 1 = \tan^2 \theta + \csc^2 \theta$$

$$\csc^2 \theta + \tan^2 \theta = \tan^2 \theta + \csc^2 \theta$$

$$\textcircled{13} \sec^2 \theta - \sin^2 \theta = \cos^2 \theta + \tan^2 \theta$$

$$\tan^2 \theta + 1 - (1 - \cos^2 \theta) = \cos^2 \theta + \tan^2 \theta$$

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

$$(14) \cot^3 \theta + \cot \theta = \frac{\cos \theta}{\sin^2 \theta}$$

$$\cot \theta (\cot^2 \theta + 1) = \frac{\cos \theta}{\sin^2 \theta}$$

$$\cot \theta (\csc^2 \theta) = \frac{\cos \theta}{\sin^2 \theta}$$

$$\frac{\cos \theta}{\sin \theta} \cdot \frac{1}{\sin^2 \theta} = \frac{\cos \theta}{\sin^3 \theta}$$

$$(15) \tan^2 \theta \cot \theta = \frac{1}{\cot \theta}$$

$$\frac{1}{\cot^2 \theta} \cot \theta = \frac{1}{\cot \theta}$$

$$\frac{1}{\cot \theta} = \frac{1}{\cot \theta}$$

$$(16) \frac{\sin^4 \theta - \cos^4 \theta}{\sin^2 \theta \cos^2 \theta - \cos^4 \theta} = \frac{\csc^2 \theta}{\cot^2 \theta}$$

$$\frac{(\sin^2 \theta - \cos^2 \theta)(\sin^2 \theta + \cos^2 \theta)}{\cos^2 \theta (\sin^2 \theta - \cos^2 \theta)} = \frac{1}{\sin^2 \theta} \cdot \frac{\sin^2 \theta}{\cos^2 \theta}$$

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