

Review

$$\textcircled{32} \quad \frac{\cos y}{(1+\sin y)} + \frac{1+\sin y}{\cos y} = 2 \boxed{\sec y}$$

$$\frac{\cos^2 y + \cancel{(1+\sin y)^2}}{\cos y(1+\sin y)}$$

$$\frac{\underline{\cos^2 y} + \underline{1} + \underline{2\sin y} + \underline{\sin^2 y}}{\cos y(1+\sin y)}$$

factor \rightarrow $\frac{2 + 2\sin y}{\cos y(1+\sin y)}$

$$\frac{\cancel{2(1+\sin y)}}{\cos y \cancel{(1+\sin y)}}$$

$$\boxed{\frac{2}{\cos y}}$$

$$2 \left(\frac{1}{\cos y} \right)$$

$$\boxed{\frac{2}{\cos y}}$$

$$(33) \quad \boxed{\sin(x+y)} + \boxed{\sin(x-y)} = 2\sin x \cos y$$

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

$$\boxed{2\sin x \cos y}$$

$$\boxed{2\sin x \cos y}$$

$$(28) \quad \boxed{\sin 2\theta} (1 - \boxed{\cos 2\theta}) = 4\sin^3 \theta \cos \theta$$

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

$$2\sin \theta \cos \theta (1 - \underline{\cos^2 \theta} + \sin^2 \theta)$$

$$2\sin \theta \cos \theta (\underline{\sin^2 \theta} + \sin^2 \theta)$$

$$(2\sin \theta \cos \theta)(2\sin^2 \theta)$$

$$\boxed{4\sin^3 \theta \cos \theta}$$

$$\boxed{4\sin^3 \theta \cos \theta}$$

$$\textcircled{15} \quad \cos^2\theta - \boxed{\sin^2\theta} = 2\cos^2\theta - 1$$

$$\cos^2\theta - (1 - \cos^2\theta)$$

$$\cos^2\theta - 1 + \cos^2\theta$$

$$\boxed{2\cos^2\theta - 1}$$

$$\boxed{2\cos^2\theta - 1}$$

Diff. of Squares

$$\textcircled{16} \quad \cos^4\theta - \sin^4\theta = \boxed{\cos^2\theta - \sin^2\theta}$$

$$\boxed{(\cos^2\theta + \sin^2\theta)(\cos^2\theta - \sin^2\theta)}$$

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

$$\boxed{(\cos^2\theta - \sin^2\theta)}$$

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

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

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

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

$$2 \left(\frac{1}{\cos^2\theta} \right)$$

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

$$\textcircled{2} \quad \boxed{\tan\theta} + \boxed{\frac{1}{\tan\theta}} = \boxed{\csc\theta} \boxed{\sec\theta}$$

$$\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}$$

$$\boxed{\frac{\sin^2\theta + \cos^2\theta}{\sin\theta\cos\theta}}$$

$$\boxed{\frac{1}{\sin\theta\cos\theta}}$$

$$\left(\frac{1}{\sin\theta}\right)\left(\frac{1}{\cos\theta}\right)$$

$$\boxed{\frac{1}{\sin\theta\cos\theta}}$$

$$\textcircled{29} \quad \underline{\cos^4 \theta} = 1 - 2\sin^2 \theta + \sin^4 \theta$$

$$\underline{(\cos^2 \theta)(\cos^2 \theta)}$$

$$(1 - \sin^2 \theta)(1 - \sin^2 \theta)$$

$$1 - 2\sin^2 \theta + \sin^4 \theta$$

$$1 - 2\sin^2 \theta + \sin^4 \theta$$

$$\textcircled{17} \frac{1 - \sin^2 \theta}{\csc^2 \theta - 1} = \sin^2 \theta$$

$$\frac{\cos^2 \theta}{\cot^2 \theta}$$

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

$$\cancel{\cos^2 \theta} \cdot \frac{\sin^2 \theta}{\cancel{\cos^2 \theta}}$$

$$\sin^2 \theta$$

Review Period 2

$$\textcircled{15} \quad \cos^2 \theta - \sin^2 \theta = 2\cos^2 \theta - 1$$

$\cos^2 \theta - (1 - \cos^2 \theta)$

$\cos^2 \theta - 1 + \cos^2 \theta$

$2\cos^2 \theta - 1$

$$\textcircled{16} \quad \cos \theta \sin \theta \cot \theta = \cos^2 \theta$$

$(\cos \theta) \cancel{\sin \theta} \left(\frac{\cos \theta}{\cancel{\sin \theta}} \right)$

$\cos^2 \theta$

Diff of Squares

$$\textcircled{16} \quad \cos^4 \theta - \sin^4 \theta = \cos^2 \theta - \sin^2 \theta$$

$(\cos^2 \theta - \sin^2 \theta)(\cos^2 \theta + \sin^2 \theta)$

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

$\cos^2 \theta - \sin^2 \theta$

$$\textcircled{20} \quad \frac{1}{(1+\sin\theta)} + \frac{1}{(1-\sin\theta)}$$

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

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

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

$$= 2 \sec^2\theta$$

$$2 \left(\frac{1}{\cos^2\theta} \right)$$

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

$$\textcircled{29} \quad \cos^4 \theta =$$

$$1 - 2\sin^2 \theta + \sin^4 \theta$$

$$\underline{\cos^2 \theta} \underline{\cos^2 \theta}$$

$$(1 - \sin^2 \theta)(1 - \sin^2 \theta)$$

$$1 - 2\sin^2 \theta + \sin^4 \theta$$

$$\textcircled{24} \quad \frac{\sec\theta - 1}{\sec\theta + 1} \stackrel{=}{\neq} \frac{1 - \cos\theta}{1 + \cos\theta}$$

$(\sec\theta - 1)(1 + \cos\theta)$ $\sec\theta + \cos\theta \boxed{\sec\theta} - 1 - \cos\theta$ $\sec\theta + \cancel{\cos\theta} \left(\frac{1}{\cancel{\cos\theta}}\right) - 1 - \cos\theta$ $\sec\theta + 1 - 1 - \cos\theta$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $\sec\theta - \cos\theta$ </div>	$(\sec\theta + 1)(1 - \cos\theta)$ $\sec\theta - \cos\theta \boxed{\sec\theta} + 1 - \cos\theta$ $\sec\theta - \cancel{\cos\theta} \left(\frac{1}{\cancel{\cos\theta}}\right) + 1 - \cos\theta$ $\sec\theta - 1 + 1 - \cos\theta$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $\sec\theta - \cos\theta$ </div>
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$$\textcircled{16} \cos^4 \theta - \sin^4 \theta = \boxed{\cos^2 \theta - \sin^2 \theta}$$

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

$$\textcircled{17} \frac{1}{1+\sin \theta} + \frac{1}{1-\sin \theta} = \boxed{2 \sec^2 \theta}$$

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

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

$$\textcircled{18} \frac{\cos y}{1+\sin y} + \frac{1+\sin y}{\cos y} = \boxed{2 \sec y}$$

$$\frac{\cos y + (1+\sin y)(1+\sin y)}{\cos y(1+\sin y)} = 2 \left(\frac{1}{\cos y} \right)$$

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

Common Factor of 2

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

$$\textcircled{19} \cos^4 \theta = 1 - 2\sin^2 \theta + \sin^4 \theta$$

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

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

$$\textcircled{20} \tan \theta + \frac{1}{\tan \theta} = \boxed{\csc \theta \sec \theta}$$

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

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

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

$$\textcircled{a)} \quad \frac{\sec\theta - 1}{\sec\theta + 1} \quad \begin{matrix} \swarrow \searrow \\ \nwarrow \nearrow \end{matrix} \quad \frac{1 - \cos\theta}{1 + \cos\theta}$$

$$(\sec\theta - 1)(1 + \cos\theta)$$

$$\sec\theta + \boxed{\sec\theta \cos\theta} - 1 - \cos\theta$$

$$\sec\theta + \left(\frac{1}{\cancel{\cos\theta}}\right) (\cancel{\cos\theta}) - 1 - \cos\theta$$

$$\sec\theta + 1 - 1 - \cos\theta$$

$$\boxed{\sec\theta - \cos\theta}$$

$$= (1 - \cos\theta)(\sec\theta + 1)$$

$$\sec\theta + 1 - \cos\theta \boxed{\sec\theta} - \cos\theta$$

$$\sec\theta + 1 - \cancel{\cos\theta} \left(\frac{1}{\cancel{\cos\theta}}\right) - \cos\theta$$

$$\sec\theta + 1 - 1 - \cos\theta$$

$$\boxed{\sec\theta - \cos\theta}$$

$$\textcircled{16} \cos^4 \theta - \sin^4 \theta = \boxed{\cos^2 \theta - \sin^2 \theta}$$

$$\boxed{(\cos^2 \theta + \sin^2 \theta)} (\cos^2 \theta - \sin^2 \theta)$$

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

$$\boxed{\cos^2 \theta - \sin^2 \theta}$$

$$\textcircled{15} \cos^2 \theta - \boxed{\sin^2 \theta} = 2\cos^2 \theta - 1$$

$$\cos^2 \theta - (1 - \cos^2 \theta)$$

$$\cos^2 \theta - 1 + \cos^2 \theta$$

$$2\cos^2 \theta - 1$$

$$\textcircled{15} \cos^2 \theta - \sin^2 \theta = 2\cos^2 \theta - 1$$

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

$$\boxed{\cos^2 \theta} \rightarrow \text{Pythagorean}$$

$$\boxed{1 - \sin^2 \theta}$$

$$\textcircled{15} \cos^2 \theta - \sin^2 \theta = 2\cos^2 \theta - \boxed{1}$$

$$2\cos^2 \theta - (\sin^2 \theta + \cos^2 \theta)$$

$$2\cos^2 \theta - \sin^2 \theta - \cos^2 \theta$$

$$\cos^2 \theta - \sin^2 \theta$$

Final Review

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

$$\boxed{\sin^2 x} \cos^2 y - \cos^2 x \boxed{\sin^2 y}$$
$$\boxed{(1 - \cos^2 x)} \cos^2 y - \cos^2 x \boxed{(1 - \cos^2 y)}$$

$$\cos^2 y - \cancel{\cos^2 x \cos^2 y} - \cos^2 x + \cancel{\cos^2 x \cos^2 y}$$

$$\boxed{\cos^2 y - \cos^2 x}$$

Final Review

$$\begin{aligned} \textcircled{4} \quad \boxed{\cos^4 \theta} &= 1 - 2\sin^2 \theta + \sin^4 \theta \quad \leftarrow \text{Factor} \\ &= (1 - \sin^2 \theta)(1 + \sin^2 \theta) \quad \leftarrow \text{Pythagorean Identity} \\ &= (\cos^2 \theta)(\cos^2 \theta) \\ &= \boxed{\cos^4 \theta} \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad \boxed{\tan^4 \theta} &= \boxed{\sec^4 \theta} (1 - 2\cos^2 \theta + \cos^4 \theta) \quad \leftarrow \text{Factor} \\ \boxed{\frac{\sin^4 \theta}{\cos^4 \theta}} & \quad \frac{1}{\cos^4 \theta} \boxed{(1 - \cos^2 \theta)(1 + \cos^2 \theta)} \quad \leftarrow \text{Pythag} \\ & \quad \frac{1}{\cos^4 \theta} (\sin^2 \theta)(\sin^2 \theta) \\ & \quad \boxed{\frac{\sin^4 \theta}{\cos^4 \theta}} \end{aligned}$$

$$\begin{aligned} \textcircled{6} \quad \boxed{\tan \theta} &= \frac{1 + \sin \theta - \cos^2 \theta}{\cos \theta (1 + \sin \theta)} \\ \boxed{\frac{\sin \theta}{\cos \theta}} & \quad \frac{\sin^2 \theta + \sin \theta}{\cos \theta (1 + \sin \theta)} \quad \leftarrow \text{Factor} \\ & \quad \frac{\sin \theta (\cancel{\sin \theta + 1})}{\cos \theta (\cancel{1 + \sin \theta})} \end{aligned}$$

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

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

$$2 \left[\frac{1}{\cos\theta} \right]$$

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

$$\boxed{\frac{2}{\cos\theta}}$$

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

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

$$\boxed{\frac{2}{\cos\theta}}$$

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

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

$$\boxed{2 \cos x \sin y}$$

$$\boxed{2 \cos x \sin y}$$

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

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

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

$$\frac{1}{\sin^2\theta} \div \frac{\cos^2\theta}{\sin^2\theta}$$

$$\frac{1}{\sin^2\theta} \times \frac{\sin^2\theta}{\cos^2\theta}$$

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

$$\textcircled{30} \quad \underline{\cos(x+y)} - \underline{\cos(x-y)} = -2\sin x \sin y$$

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

$$\cancel{\cos x \cos y} - \sin x \sin y - \cancel{\cos x \cos y} - \sin x \sin y$$

$$\boxed{-2\sin x \sin y}$$

$$\textcircled{31} \quad \frac{1 + \boxed{\cos^2 \theta}}{\boxed{\sin^2 \theta}} = \boxed{\cot^2 \theta}$$

$$\frac{1 + (\cos^2 \theta - \sin^2 \theta)}{2\sin \theta \cos \theta} \quad \left| \quad \frac{\cos \theta}{\sin \theta}$$

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

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

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

$$\boxed{\frac{\cos \theta}{\sin \theta}}$$

$$\textcircled{3a} \quad \frac{\cos y}{1+\sin y} + \frac{1+\sin y}{\cos y} = 2 \boxed{\sec y}$$

$$\frac{\overset{\text{FOIL}}{\cos^2 y + (1+\sin y)(1+\sin y)}}{\cos y(1+\sin y)} \quad \left| \quad 2 \left(\frac{1}{\cos y} \right) \right.$$

$$\frac{\cos^2 y + 1 + 2\sin y + \sin^2 y}{\cos y(1+\sin y)} \quad \left| \quad \frac{2}{\cos y} \right.$$

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

$$\frac{2 \cancel{(1+\sin y)}}{\cos y \cancel{(1+\sin y)}}$$