

Trig I-2: 21, 23, 26, 28

$$21. \frac{(1-\cos A)}{(1-\cos A)(1+\cos A)} + \frac{1}{(1-\cos A)(1+\cos A)} = \frac{1-\cos A + 1+\cos A}{(1-\cos A)(1+\cos A)} = \frac{2}{1-\cos^2 A}$$

$$= \frac{2}{\sin^2 A} = 2 \cdot \frac{1}{\sin^2 A} = \boxed{2\csc^2 A}$$

$$23. \frac{\tan \alpha - \cot \alpha}{\sec \alpha - \csc \alpha} = \frac{\left(\frac{\sin \alpha}{\cos \alpha} - \frac{\cos \alpha}{\sin \alpha}\right) \sin \alpha \cos \alpha}{\left(\frac{1}{\cos \alpha} - \frac{1}{\sin \alpha}\right) \sin \alpha \cos \alpha} = \frac{\sin^2 \alpha - \cos^2 \alpha}{\sin \alpha - \cos \alpha}$$

$$= \frac{(\sin \alpha + \cos \alpha)(\sin \alpha - \cos \alpha)}{\sin \alpha - \cos \alpha} = \boxed{\sin \alpha + \cos \alpha}$$

$$26. (1+\cot \theta)^2 + (1-\cot \theta)^2 = 1 + 2\cot \theta + \cot^2 \theta + 1 - 2\cot \theta + \cot^2 \theta$$

$$= 2 + 2\cot^2 \theta = 2(1 + \cot^2 \theta) = \boxed{2\csc^2 \theta}$$

$$28. \frac{\sin x}{(\csc x - \cot x)(\csc x + \cot x)} + \frac{\sin x}{(\csc x + \cot x)(\csc x - \cot x)} = \frac{\sin x \csc x + \sin x \cot x + \sin x \csc x - \sin x \cot x}{(\csc x + \cot x)(\csc x - \cot x)}$$

$$= \frac{2\sin x \csc x}{\csc^2 x - \cot^2 x} = \frac{2 \cdot \sin x \cdot \frac{1}{\sin x}}{1} = \frac{2}{1} = \boxed{2}$$