(iv) $\sec^2 A + \operatorname{cosec}^2 A = \sec^2 A \operatorname{cosec}^2 A$

$\Rightarrow \frac{1}{\cos^2 A} + \frac{1}{\sin^2 A} \Rightarrow \frac{\sin^2 A + \cos^2 A}{\cos^2 A \sin^2 A}$

$\Rightarrow \frac{1}{\frac{1}{\sec^2 A} \times \frac{1}{\operatorname{cosec}^2 A}} \Rightarrow \sec^2 A \operatorname{cosec}^2 A$ proved !!

(iii) $(1 + \tan A)^2 + (1 - \tan A)^2 = 2 \sec^2 A$

$\Rightarrow 1^2 + \tan^2 A + 2\tan A + 1^2 + \tan^2 A - 2\tan A$
$\Rightarrow 1 + \tan^2 A + 1 + \tan^2 A$
$\Rightarrow \sec^2 A + \sec^2 A = 2 \sec^2 A$ proved !!

(17i) $\frac{1 + \sin A}{\cos A} + \frac{\cos A}{1 + \sin A} = 2 \sec A$

$\Rightarrow \frac{(1 + \sin A)(1 + \sin A) + \cos^2 A}{\cos A \times (1 + \sin A)}$

$\Rightarrow \frac{1 + \sin A + \sin A + \sin^2 A + \cos^2 A}{\frac{1}{\sec A} \times (1 + \sin A)}$

$\Rightarrow 2 + 2\sin A \times \frac{\sec A}{1 + \sin A} \Rightarrow 2\cancel{(1 + \sin A)} \times \frac{\sec A}{\cancel{1 + \sin A}}$

$\Rightarrow 2 \sec A$ proved !!

(ii) $\frac{\tan A}{\sec A - 1} + \frac{\tan A}{\sec A + 1} = 2 \operatorname{cosec} A$

$\Rightarrow \frac{\tan A(\sec A + 1) + \tan A(\sec A - 1)}{\sec^2 A - 1^2}$

$\Rightarrow \frac{\tan A \sec A + \cancel{\tan A} + \tan A \sec A - \cancel{\tan A}}{\tan^2 A}$

$\Rightarrow \frac{2 \cancel{\tan A} \sec A}{\tan^2 A} \Rightarrow \frac{2 \sec A}{\tan A}$

$\Rightarrow \frac{2 \times \frac{1}{\cos A}}{\frac{\sin A}{\cos A}} \Rightarrow \frac{2}{\cancel{\cos A}} \times \frac{\cancel{\cos A}}{\sin A} \Rightarrow \frac{2}{\sin A}$

$\Rightarrow \frac{2}{\frac{1}{\operatorname{cosec} A}} \Rightarrow 2 \operatorname{cosec} A$ proved !!

(18i) $\frac{\operatorname{cosec} A}{\operatorname{cosec} A - 1} + \frac{\operatorname{cosec} A}{\operatorname{cosec} A + 1} = 2 \sec^2 A$

$\Rightarrow \frac{\operatorname{cosec} A(\operatorname{cosec} A + 1) + \operatorname{cosec} A(\operatorname{cosec} A - 1)}{\operatorname{cosec}^2 A - 1^2}$

$\Rightarrow \frac{\operatorname{cosec}^2 A + \cancel{\operatorname{cosec} A} + \operatorname{cosec}^2 A - \cancel{\operatorname{cosec} A}}{\cot^2 A}$

$\Rightarrow \frac{2 \operatorname{cosec}^2 A}{\cot^2 A} \Rightarrow \frac{2}{\frac{\sin^2 A}{\cos^2 A}} \Rightarrow 2 \times \frac{\cancel{\sin^2 A}}{\cancel{\sin^2 A}} \frac{\cos^2 A}{\sin^2 A}$

$\Rightarrow \frac{2}{\cos^2 A} = 2\sec^2 A$ proved !!

(ii) $\cot A - \tan A = \frac{2\cos^2 A - 1}{\sin A \cos A}$

$\Rightarrow \frac{\cos^2 A}{\sin A} - \frac{\sin A}{\cos A}$ $\Rightarrow \frac{\cos^2 A - \sin^2 A}{\sin A \cos A}$

$\Rightarrow \frac{\cos^2 A - (1 - \cos^2 A)}{\sin A \cos A}$ $\Rightarrow \frac{\cos^2 A - 1 + \cos^2 A}{\sin A \cos A}$

$\Rightarrow \frac{2\cos^2 A - 1}{\sin A \cos A}$ proved !!

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

$\Rightarrow \frac{\frac{1}{\tan A} - 1}{2 - (1 + \tan^2 A)}$ $\Rightarrow \frac{1 - \tan A}{\tan A}$ $\frac{}{2 - 1 - \tan^2 A}$

$\Rightarrow \frac{1 - \tan A}{\tan A} \times \frac{1}{1 - \tan^2 A}$ $\Rightarrow \frac{1 - \tan A}{\tan A} \times \frac{1}{(1 + \tan A)(1 - \tan A)}$

$\Rightarrow \frac{1}{\tan A} \times \frac{1}{1 + \tan A}$ $\Rightarrow \frac{\cot A}{1 + \tan A}$ proved !!

(19i) $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$

$\Rightarrow \frac{1}{\cot^2 \theta} - \frac{1}{\operatorname{cosec}^2 \theta}$ $\Rightarrow \frac{\operatorname{cosec}^2 \theta - \cot^2 \theta}{\cot^2 \theta \operatorname{cosec}^2 \theta}$

$\Rightarrow \dfrac{1}{\frac{1}{\tan^2\theta} \times \frac{1}{\sin^2\theta}} = \tan^2\theta \sin^2\theta$ proved!!

(ii) $\dfrac{\cos\theta}{1-\tan\theta} - \dfrac{\sin^2\theta}{\cos\theta - \sin\theta} = \cos\theta + \sin\theta$

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

$\Rightarrow \dfrac{\cos^2\theta}{\cos\theta - \sin\theta} - \dfrac{\sin^2\theta}{\cos\theta - \sin\theta} \Rightarrow \dfrac{\cos^2\theta - \sin^2\theta}{\cos\theta - \sin\theta}$

$\Rightarrow \dfrac{(\cos\theta + \sin\theta)(\cos\theta - \sin\theta)}{(\cos\theta - \sin\theta)} \Rightarrow \cos\theta + \sin\theta$ proved!!

(2i) $\operatorname{cosec}^4\theta - \operatorname{cosec}^2\theta = \cot^4\theta + \cot^2\theta$

$\Rightarrow (1 + \cot^2\theta)^2 - (1 + \cot^2\theta)$
$\Rightarrow 1 + 2\cot^2\theta + \cot^4\theta - 1 - \cot^2\theta$
$\Rightarrow 2\cot^2\theta - \cot^2\theta + \cot^4\theta$
$\Rightarrow \cot^2\theta + \cot^4\theta$ proved!!

(ii) $2\sec^2\theta - \sec^4\theta - 2\operatorname{cosec}^2\theta + \operatorname{cosec}^4\theta = \cot^4\theta - \tan^4\theta$

$\Rightarrow 2(1 + \tan^2\theta) - (1 + \tan^2\theta)^2 - 2(1 + \cot^2\theta) + (1 + \cot^2\theta)^2$
$\Rightarrow (2 + 2\tan^2\theta) - (1^2 + \tan^4\theta + 2\tan^2\theta) - (2 + 2\cot^2\theta) + (1 + \cot^4\theta + 2\cot^2\theta)$
$\Rightarrow 2 + 2\tan^2\theta - 1 - \tan^4\theta - 2\tan^2\theta - 2 - 2\cot^2\theta + 1 + \cot^4\theta + 2\cot^2\theta$
$\Rightarrow \cot^4\theta - \tan^4\theta$ proved!!

(21i) $\frac{1+\cos\theta-\sin^2\theta}{\sin\theta(1+\cos\theta)} = \cot\theta$

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

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

$\Rightarrow \frac{\cos\theta}{\sin\theta} \Rightarrow \cot\theta$ proved!!

(ii) $\frac{\tan^3\theta-1}{\tan\theta-1} = \sec^2\theta+\tan\theta$

$\Rightarrow a^3-b^3=(a-b)(a^2+b^2+ab)$

$\Rightarrow \frac{(\tan\theta-1)(\tan^2\theta+1+\tan\theta)}{\tan\theta-1}$

$\Rightarrow \tan^2\theta+1+\tan\theta$

$\Rightarrow \sec^2\theta+\tan\theta$ proved!!

(22i) $\frac{1+\operatorname{cosec}A}{\operatorname{cosec}A} = \frac{\cos^2A}{1-\sin A}$

$\Rightarrow \frac{1+\frac{1}{\sin A}}{\frac{1}{\sin A}} \Rightarrow \frac{\sin A+1}{\sin A} \times \sin A$

$\Rightarrow \sin A + 1 \times \frac{1 - \sin A}{1 - \sin A}$

$\Rightarrow \frac{1 - \sin^2 A}{1 - \sin A} \Rightarrow \frac{\cos^2 A}{1 - \sin A}$ proved !!

(ii) $\sqrt{\frac{1 - \cos A}{1 + \cos A}} = \frac{\sin A}{1 + \cos A}$

$\Rightarrow \sqrt{\frac{1 - \cos A}{1 + \cos A}} \times \sqrt{\frac{1 + \cos A}{1 + \cos A}}$

$\Rightarrow \sqrt{\frac{1^2 - \cos^2 A}{(1 + \cos A)^2}} \Rightarrow \frac{\sqrt{\sin^2 A}}{1 + \cos A}$

$\Rightarrow \frac{\sin A}{1 + \cos A}$ proved !!

(23i) $\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \tan A + \sec A$

$\Rightarrow \sqrt{\frac{1 + \sin A}{1 - \sin A}} \times \sqrt{\frac{1 + \sin A}{1 + \sin A}}$

$\Rightarrow \sqrt{\frac{(1 + \sin A)^2}{1^2 - \sin^2 A}} \Rightarrow \frac{1 + \sin A}{\sqrt{\cos^2 A}}$

$\Rightarrow \frac{1}{\cos A} + \frac{\sin A}{\cos A} \Rightarrow \sec A + \tan A$ proved !!