3. Simplify:

i) $\sin\theta(1-\cos\theta)+\cos\theta(1+\sin\theta)$

$= \sin\theta - \cancel{\sin\theta\cos\theta} + \cos\theta + \cancel{\sin\theta\cos\theta}$

$= \sin\theta + \cos\theta$

ii) $7\cos^2\theta - 5\sin^2\theta - 6(\cos^2\theta + 6\cancel{\cos}\sin^2\theta)$

→ $7\cos^2\theta - 5\sin^2\theta - 6\cos^2\theta + 6\sin^2\theta$

→ $7\cos^2\theta - 6\cos^2\theta + 6\sin^2\theta - 5\sin^2\theta$

→ $\cos^2\theta + \sin^2\theta$

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

→ $(1)^2 + 2\cdot 1\cdot\tan A + (\tan A)^2 + (1)^2 - 2\cdot 1\cdot\tan A + (\tan A)^2$

→ $1 + 2\tan A + \tan^2 A + 1 - 2\tan A + \tan^2 A$

→ $1 + 1 + \tan^2 A + \tan^2 A$

→ $2 + 2\tan^2 A$

→ $2(1 + \tan^2 A)$

iv) $\dfrac{(\sin A - \cos A)^2}{\sin^2 A - \cos^2 A}$

→ $\dfrac{(\sin A - \cos A)(\sin A - \cos A)}{(\sin A + \cos A)(\sin A - \cos A)}$

→ $\dfrac{\sin A - \cos A}{\sin A + \cos A}$

v) $(\sin A + \cos A)^2 + (\sin A - \cos A)^2$

→ $(\sin A + \cos A)(\sin A + \cos A) + (\sin A -$

→ $\sin^2 A + 2\sin A\cos A + \cos^2 A + \sin^2 A -$
$2\sin A\cos A + \cos^2 A$

→ $\sin^2A + \cos^2A + \sin^2A + \cos^2A$

→ $2\sin^2A + 2\cos^2A$

→ $2(\sin^2A + \cos^2A)$

vi) $\dfrac{1-\tan^2A}{1+\tan A}$

→ $\dfrac{(1)^2 - (\tan A)^2}{1+\tan A}$

→ $\dfrac{(1+\tan A)(1-\tan A)}{(1+\tan A)}$

→ $1-\tan A$

3 (vii) $\frac{\tan^3\theta - 4\tan\theta}{\tan\theta + 2}$

$\rightarrow \frac{\tan\theta(\tan^2\theta - 4)}{\tan\theta + 2}$

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

$\rightarrow \frac{\tan\theta(\tan\theta + 2)(\tan\theta - 2)}{(\tan\theta + 2)}$

$\rightarrow \tan\theta(\tan\theta - 2)$

viii) $\frac{1}{1+\cos\alpha} + \frac{1}{1-\cos\alpha}$

$\rightarrow \frac{1-\cos\alpha+1+\cos\alpha}{(1-\cos\alpha)(1+\cos\alpha)}$

$\rightarrow \frac{2}{1-\cos^2\alpha}$

3(ix) $\frac{\sin A}{\sin A + \cos A} + \frac{\cos A}{\sin A + \cos A}$

$\rightarrow \frac{\sin A + \cos A}{\sin A + \cos A}$

$\rightarrow 1$

3(x) $\frac{1}{1 - \sin\alpha} + \frac{\sin\alpha}{\sin\alpha - 1}$

$\rightarrow \frac{1}{1 - \sin\alpha} + \frac{\sin\alpha}{-(1 - \sin\alpha)}$ $\rightarrow \frac{1}{1 - \sin\alpha} - \frac{\sin\alpha}{1 - \sin\alpha}$

$\rightarrow \frac{1 - \sin\alpha}{1 - \sin\alpha}$

$\rightarrow 1$ //