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Ex-2(III)

1. Find the product of the following:

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

→ $(1)^2 - (\sin\theta)^2$

→ $1-\sin^2\theta$

ii) $(\tan A+\cot A)(\tan A-\cot A)$

→ $(\tan A)^2 - (\cot A)^2$

→ $\tan^2 A - \cot^2 A$

iii) $(\sin\alpha+\cos\alpha)(\sin\alpha+\cos\alpha)$

→ $(\sin\alpha+\cos\alpha)^2$

→ $(\sin\alpha)^2 + 2\cdot\sin\alpha\cdot\cos\alpha + (\cos\alpha)^2$

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

iv) $(3\sec\beta - 2\tan\beta)(3\sec\beta + 2\tan\beta)$

→ $(3\sec\beta)^2 - (2\tan\beta)^2$

→ $9\sec^2\beta - 4\tan^2\beta$

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

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

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

$\rightarrow (1)^2 - (\tan^2 A)^2$

$\rightarrow 1 - \tan^4 A$

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

$\rightarrow (\sin\theta)^3 - (\cos\theta)^3$

$\rightarrow \sin^3\theta - \cos^3\theta$

2. Factorize:

i) $\sin\theta \cdot \cos^2\theta + \cos\theta \cdot \sin^2\theta$

$\rightarrow$ ~~$\sin\theta$~~ $\sin\theta \cdot \cos\theta(\cos\theta + \sin\theta)$

ii) $2\sin^2\theta - 3\sin\theta \cdot \cos\theta$

$\rightarrow \sin\theta(2 - 3\cos\theta)$ $2\sin\theta - 3\cos\theta)$

iii) $\sin A(\sin A + \cos A) + \cos A(\sin A + \cos A)$

$\rightarrow$ ~~$(\sin A)^2 + \cos A \cdot \sin A + \cos A \cdot \sin A + (\cos A)^2$~~

$\rightarrow$ ~~$\sin^2 A + 2\sin A \cos A + \cos^2 A$~~

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

→ $(\sin A + \cos A)^2$

iv) $\sin^2 A - \cos^2 B$

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

v) $\sin^3\theta - \sin\theta\cos^2\theta$

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

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

vi) $\tan^3\alpha - \cot^3\alpha$

→ $(\tan\alpha - \cot\alpha)(\tan^2\alpha + \tan\alpha \cdot \cot\alpha + \cot^2\alpha)$

vii) $\sec^4\beta - \cos^4\beta$

→ $(\sec^2\beta - \cos^2\beta)(\sec^2\beta + \cos^2\beta)$

→ $(\sec\beta + \cos\beta)(\sec\beta - \cos\beta)(\sec^2\beta + \cos^2\beta)$

viii) $\cos^4\theta + \sin^3\theta\cos\theta$

→ $\cos\theta(\cos^3\theta + \sin^3\theta)$

→ $\cos\theta(\cos^8\theta + \sin\theta)(\cos^2\theta - \cos\theta\sin\theta + \sin^2\theta)$

ix) $\sin^2 A - 3\sin A + 2$

→ ~~$\sin A(\sin A - 3 + 2)$~~

→ ~~$\sin A(\sin A$~~

→ $\sin^2 A - (2+1)\sin A + 2$

→ $\sin^2 A - 2\sin A - \sin A + 2$

→ $\sin A(\sin A - 2) - 1(\sin A - 2)$

→ $(\sin A - 2)(\sin A - 1)$

x) $\tan^2 A - 3\tan A - 10$

→ $\tan^2 A - (5-2)\tan A - 10$

→ $\tan^2 A - 5\tan A + 2\tan A - 10$

→ $\tan A(\tan A - 5) + 2(\tan A - 5)$

→ $(\tan A - 5)(\tan A + 2)$