$$\frac{\cancel{3}^{1}}{2\cdot\cancel{3}_{1}} = \frac{1}{2}$$

Problem 5. *Show that:*
a) $\sin(\alpha+\beta)+\sin(\alpha-\beta) = 2\sin(\alpha)\cos(\beta)$.

$$\sin(\alpha+\beta)+\sin(\alpha-\beta) = \sin(\alpha)\cos\beta + \sin\beta\cos\alpha + \sin(\alpha)\cos\beta - \sin\beta\cos\alpha$$

using
$\sin(\alpha+\beta) = \sin(\alpha)\cos\beta + \sin(\beta)\cos(\alpha)$
$\sin(\alpha-\beta) = \sin(\alpha)\cos\beta - \sin(\beta)\cos(\alpha)$

$$= 2\sin(\alpha)\cos(\beta)$$

b) $\tan\theta + \frac{\cos\theta}{1+\sin\theta} = \sec\theta$

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

using
$\tan\theta = \frac{\sin\theta}{\cos\theta}$

$$= \frac{\sin\theta+1}{\cos\theta\,(1+\sin\theta)} = \frac{1}{\cos\theta} = \sec\theta$$

using
$\sin^2\theta + \cos^2\theta = 1$

using
$\sec\theta = \frac{1}{\cos\theta}$

$1+\sin\theta = \sin\theta + 1$