Questions from homework

⑤ $\sec^2\theta - \sin^2\theta = \cos^2\theta + \tan^2\theta$

$\frac{1}{\cos^2\theta} - \frac{\sin^2\theta}{1}$ | $\frac{\cos^2\theta}{1} + \frac{\sin^2\theta}{\cos^2\theta}$

$\frac{1 - \sin^2\theta\cos^2\theta}{\cos^2\theta}$ | $\frac{\cos^4\theta + \sin^2\theta}{\cos^2\theta}$

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

$\frac{1 - \cos^2\theta + \cos^4\theta}{\cos^2\theta}$

$\frac{\sin^2\theta + \cos^4\theta}{\cos^2\theta}$

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$\sec^2\theta - \tan^2\theta = \sin^2\theta + \cos^2\theta$

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⑧ $\sec\theta - \tan\theta\sin\theta = \cos\theta$

$\frac{1}{\cos\theta} - \left(\frac{\sin\theta}{\cos\theta}\right)(\sin\theta)$

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

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

$\frac{\cos^2\theta}{\cos\theta}$

$\cos\theta$

Sum & Difference Identities

The sum identities are

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$
$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$
$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

The three angle difference identities are

$$\sin(A - B) = \sin A \cos B - \cos A \sin B$$
$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$
$$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

Prove the following:

$$\cos(A+B)-\cos(A-B)=-2\sin A\sin B$$

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

$\cos A\cos B-\sin A\sin B-\cos A\cos B-\sin A\sin B$

$-2\sin A\sin B$

Double Angle Identities

The double-angle identities are

$$\sin 2A = 2 \sin A \cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

Prove the following:

$$\frac{1+\cos 2\theta}{\sin 2\theta} = \cot\theta$$

$$\frac{1+(\cos^2\theta - \sin^2\theta)}{2\sin\theta\cos\theta} \quad \left| \quad \frac{\cos\theta}{\sin\theta}\right.$$

$$\frac{\sin^2\theta+\cos^2\theta+\cos^2\theta-\sin^2\theta}{2\sin\theta\cos\theta}$$

$$\frac{2\cos^2\theta}{2\sin\theta\cos\theta}$$

$$\frac{\cos\theta}{\sin\theta}$$

Homework