Section 6.2 continued

Double-Angle Identities

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

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

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

ex.1 pg.301

Write as a single trig expression

$\cos^2\frac{\pi}{3} - \sin^2\frac{\pi}{3}$ ← Cos 2A Identity

$\cos 2\left(\frac{\pi}{3}\right)$

$\cos \frac{2\pi}{3}$

ex 2 pg.302

Determine an identity for cos 2A that contains only cosine.

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

$= \cos^2 A - (1-\cos^2 A)$

$\{\cos^2 x + \sin^2 x = 1,\ \sin^2 x = 1 - \cos^2 x\}$

$\cos 2A = \cos^2 A - 1 + \cos^2 A$

$\boxed{\cos 2A = 2\cos^2 A - 1}$

Another version of the Identity

Write cos 2A identity using only sine.

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

$= (1-\sin^2 A) - \sin^2 A$

$\boxed{\cos 2A = 1 - 2\sin^2 A}$

Ex. 4 pg. 304

Determine the exact value for

a) $\sin\frac{\pi}{12}$

Special angles

$\frac{\pi}{6}, \frac{\pi}{3}, \frac{\pi}{4}, \frac{\pi}{2}$

$\frac{2\pi}{12}, \frac{4\pi}{12}, \frac{3\pi}{12}$

$\frac{6\pi}{12}$

$\sin\left(\frac{4\pi}{12} - \frac{3\pi}{12}\right)$

$\sin\left(\frac{\pi}{3} - \frac{\pi}{4}\right) \leftarrow$ Identity

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

$\sin\frac{\pi}{3}\cos\frac{\pi}{4} - \cos\frac{\pi}{3}\sin\frac{\pi}{4}$

$\left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) - \left(\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right)$

$\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} = \frac{\sqrt{6}-\sqrt{2}}{4}$

b) $\tan 105°$

$\tan(45° + 60°)$ or $\tan(135° - 30°)$

$\boxed{\text{Identity}}$

$\frac{\tan A + \tan B}{1 - \tan A \tan B}$

$\frac{\tan A - \tan B}{1 + \tan A \tan B}$

$\frac{\sqrt{3} + 1}{1 - \sqrt{3}} \cdot \frac{1 + \sqrt{3}}{1 + \sqrt{3}}$

rationalize the denominator

$\frac{2\sqrt{3} + 4}{-2}$

$\boxed{-\sqrt{3} - 2}$

pg. 306
#1 b, c, d, e
#2. c, d
4. a, b, c
5 a, b
8 a → e