

TRIGONOMETRY: COMPOUND AND DOUBLE ANGLES 8 APRIL 2013

Lesson Description

In this lesson we:

- Use the compound and double angle trigonometric identities to solve typical exam paper questions

Key Concepts

Compound Angle Formulae

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

Double Angle Formulae

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

Questions

Question 1

Simplify each of the following without using a calculator:

- a.) $\sin 75^\circ$
 b.) $\tan 195^\circ$

Question 2

Adapted from NCS Nov 2009, Paper 2, Question 10.1

Prove the identity:

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

Question 3

Adapted from NCS Nov 2009, Paper 2, Question 9.3

Determine the general solution of: $\sin x + 2\cos^2 x = 1$

Question 4

The following identity is given:

$$\frac{1}{\cos 2A} + \frac{\sin 2A}{\cos 2A} = \frac{\sin A + \cos A}{\cos A - \sin A}$$

4.1 Give the values of A for which this identity will be undefined. (2)

4.2 Prove the following identity (6)

Question 5

If $\tan(A + B) = \frac{\sin(A+B)}{\cos(A+B)}$, prove that in any triangle ABC that

$$\tan A \cdot \tan B \cdot \tan C = \tan A + \tan B + \tan C.$$

