

## REVISION: TRIGONOMETRY

17 JUNE 2013

### Lesson Description

In this lesson we revise how to:

- Use the compound and double angle trigonometric identities to solve typical exam paper questions
- Use transformations to find the image of a point after rotation

### 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:  $\sin x + 2\cos^2 x = 1$

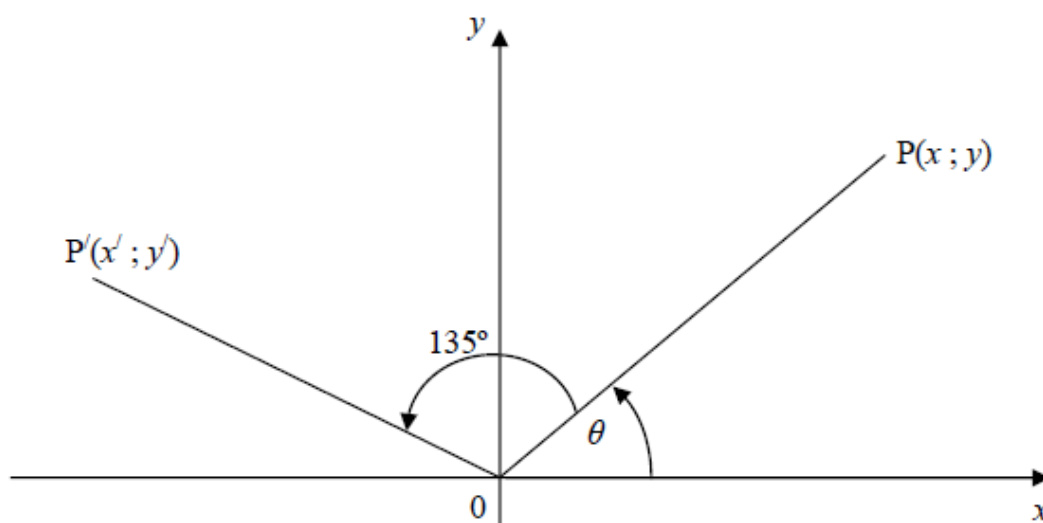
**Question 4***(Adapted from NSC P2 Feb-Mar 2009, Question 6.3)*

Solve for  $x \in [0^\circ ; 360^\circ]$  if  $\frac{1}{2} \cos x = 0,435$  (3)

**Question 5***(Adapted from NSC P2 Feb-Mar 2009, Question 4)*

Show that the coordinates of  $P'$ , the image of  $P(x ; y)$  rotated about the origin through an angle of  $135^\circ$ , in the anti-clockwise direction, is given by

a.)  $\left(-\frac{\sqrt{2}}{2}x - \frac{\sqrt{2}}{2}y ; -\frac{\sqrt{2}}{2}y + \frac{\sqrt{2}}{2}x\right)$  (4)



- b.)  $M'$  is the image of  $M(2 ; 4)$  under a rotation about the origin through  $135^\circ$ , in the anticlockwise direction.  
 Determine the coordinates of  $M'$ , using the results in QUESTION (a.). (2)