

**Mathematics**

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.*

**Time: 3 hrs.**

**Full Marks: 100**

**Pass Marks: 35** (For partial students only)

**Attempt all questions.**

**Group 'A'**

**5 × 3 × 2 = 30**

1. a. Find the truth value of the biconditional statement of  $p$  and  $q$  where  $p$  represents '2 is an even number' and  $q$  represents '4 is an even number'.  
b. If  $f: \mathbb{R} \rightarrow \mathbb{R}$  be defined by  $f(x) = 2x - 3$ , find  $f^{-1}$   
c. Test the even or odd nature and symmetricity of the function  $y = 8x^2$
2. a. Express  $\tan^{-1}x$  in terms of inverse of sin function.  
b. Prove by mathematical induction:  $1 + 3 + 5 + \dots + (2n - 1) = n^2$   
c. Find the adjoint of the matrix  $\begin{pmatrix} 2 & 5 \\ 3 & -7 \end{pmatrix}$
3. a. Using Cramer's rule, solve:  $3x + 2y + 9 = 0$ ,  $2x - 3y + 6 = 0$   
b. Express  $\sqrt{3} + i$  in polar form.  
c. If one root of the equation  $ax^2 + bx + c = 0$  be twice the other, show that  $2b^2 = 9ac$
4. a. Find the equation of the straight line that has  $y$ -intercept '2' and is parallel to  $4x - 8y + 3 = 0$   
b. Find the equation of the circle which passes through origin and makes equal intercepts on both axes.  
c. Evaluate:  $\lim_{x \rightarrow 0} \frac{1 - \cos nx}{1 - \cos mx}$

**Contd...**

# Maths Paper 2 Prep Examination 2012 Memo Gauteng

**H Kauffman**



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