جامعة الفيـــــوم	الفرقة الرابعة	المادة : تحليل مركب
كليـــــة التربيـــــة	اساسى " قديم "	امتحان دور يناير 2011
قســـم الرياضيـــات	شعبة الرياضيات	الزمن : ثلاث ساعة

(1)(a) Find the image of rectangular hyperbolas $x^2 - y^2 = a$ *and* $xy = b$ *under* $w = z^2$.

(b) prove that , if f(z) is differentiable at z_0 then f(z) is continuous at z_0.

(c) Find $\int_c z^2 dz$ where c is the two lines from (0,0) to (2,0) and from (2,0) to $(2, \Pi/2)$.

(2)(a) Prove that , $\lim_{z \to z_0} z^2 = z_0^2$.

(b) Prove that , if f be analytic inside and on a simple closed contour c and **a** be a point inside c then $\int_c \frac{f(z)dz}{z-a} = 2\Pi i\, f(a)$.

(3)(a) Find the image of the region y>1 under w=(1-i)z .

(b) Find $\int_c \frac{zdz}{(9-z^2)(z+1)}$ *where* $c: |z| = 2$.

(c) Prove that , if f(z) is a continuous at z=z_0 then it is bounded on a neigh. Of z_0.

(4)(a) Evaluat $\int_c \frac{dz}{z}$ where (i) $c: |z| = 1$, (ii) $c: |z+1| = \frac{1}{2}$.

(b) Prove that , the conjugate functions u and v of the analytic function f(z) are harmonic functions.

(5)(a) Prove that the function f(z) = e^z is differentiable at each point in c , and find $f'(z)$.

(b) Find the image of the parabola $y^2 = 4ax$ *under* $w = \frac{1}{z}$.

(c) Find the points where $f(z) = x^2 + y^2 + i(e^y - 2xy)$ is differentiable.

(مع تمنيـــــاتي بالنجـــاح)