

Complex Analysis

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- (1) Put  $z = x + yi$  and  $u(x, y) = ax^2y - y^3 + xy$ .  
(a) Choose the constant  $a$  such that the function  $u(x, y)$  is harmonic.  
(b) Find all analytic functions whose real parts are  $u$ .
- (2) Evaluate

$$\int_0^{2\pi} \frac{d\theta}{5 + 4 \cos \theta}$$

- (3) Find all bounded entire functions.