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SCHOOL OF PURE AND APPLIED SCIENCE  
DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE  
UNIT CODE: BMA 1102  
UNIT NAME: CALCULUS I  
SCHOOLBASED

CAT 2 (TAKE-AWAY ASSIGNMENT)

DATE: 28<sup>TH</sup> JULY 2014

INSTRUCTIONS: ANSWER ALL QUESTIONS

a) If  $y = A \cos nx + b \sin nx$  where  $A$ ,  $B$  and  $n$  are constants. prove that  $y'' = -n^2 y$   
(6 marks)

b) An open cylindrical tank is to be thin metal, to hold a given volume  $v$ . show that the area of material used will be least if the height is made equal to radius. (7marks)

c) find  $\frac{dy}{dx}$  given that

i.  $y = \sin^2 (2x - 1)^{3/2}$  (6 marks)

ii.  $y = \frac{e^{x^2} \sqrt{\sin x}}{(2x+1)^3}$  (6marks)

iii.  $y = 2^{x^2}$  (5marks)