

STA 115 INTRODUCTION TO MATHEMATICS FOR FINANCE

SECTION A (Answer all questions)

QUESTION ONE - 16 Marks

a) Define the following terms

- i) A function
- ii) A shape
- iii) Y intercept

(2mks)

(2mks)

(2mks)

b) The state government revenue analysts know that annual tax revenues for the state are dependant to a large extent on the unemployment rate in the state. This relationship is explained by,

$$Y = 11.7 - 0.4X$$

- i) Interpret the values for the y intercept and the slope of the function where,  $Y$  - represents annual tax revenues in billions of dollars and  $X$  = unemployment as percentage of the state work force (2mks)
- ii) Find the annual tax revenue when the unemployment rate is 8 percent (2mks)

c) If a population of a country increases every year by 2% of the population at the beginning of the year, in how many years (approximately) will the total increase of the population be 40% (4mks)

d) Find the interest and the amount if \$500 is borrowed for 4 month at a simple interest rate of 10% per annum (2mks)

QUESTION TWO ( 15 Marks )

a) The line passing through the origin and  $p(x, y)$  has slope +2, and the line through  $(-1,0)$  and  $p(x,y)$  has slope +1. Find  $x$  and  $y$  (3mks)

b) Given the matrices

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 1 \\ -3 & -2 \end{bmatrix}, \text{ find}$$

i)  $(A + B)^2$  (2mks)

ii)  $A^2 + 2AB + B^2$  (2mks)

iii) Is  $(A+B)^2 = A^2 + 2AB + B^2$ ? (1mk)