UNIT 1

STATION III – Limits to INFINITY – (ALGEBRAICALLY)

1.1 Students prove and use theorems evaluating the limits of sums, products, quotients, and composition of functions.

LEVEL 1

Complete the following sentences below.

1. If the limit as x approaches infinity is equal to _____, then the function does not have a horizontal asymptote.

2. If the limit as x approaches infinity is equal to some number 'a,' then the function has a horizontal asymptote at _____.

LEVEL 2

[21]. Find the limit $\lim_{t\to\infty} \frac{3}{1+t^2}$.

[22]. Find the limit $\lim_{x\to\infty} \frac{x^2+x+1}{(3x+2)^2}$.

[23]. Find the limit $\lim_{s\to\infty} \frac{s^4+s^2+13}{s^3+8s+9}$.

LEVEL 3

[24]. Find the limit $\lim_{x\to\infty} \frac{2x^2}{(x+2)^3}$.

[25]. Suppose the total cost, $C(q)$, of producing a quantity q of a product is given by the equation

$$C(q) = 5000 + 5q.$$

The average cost per unit quantity, $A(q)$, equals the total cost, $C(q)$, divided by the quantity produced, q. Find the limiting value of the average cost per unit as q tends to ∞. In other words find

$$\lim_{q\to\infty} A(q)$$