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CSIS 213-3941

Assignment 5&6 Quiz Part 2

**Question 1**

u, v and t are integers.

x is a real number that satisfies the equation

(-ux +t) / vx  = 5  
   
Must  x  be  rational?  If  so,  express  x  as  a  ratio  of  two integers and show why those two are integers.

**Proof:**

Suppose there exists an x where x is not a rational number [x being a real number that satisfies the equation]. Thus,

(-ux + t) / vx = 5

(-ux / vx) + (t / vx) = 5

(-u / v) + (t / vx) = 5

-u + (t / x) = 5v

t / x = 5v + u

t = (tv + u) x

Let y = 5v + u. Note y is an integer because it is the sum of two integers. Hence,

t = xy

(t / y) = x

It follows by definition that x is a ratio of two integers t / y.