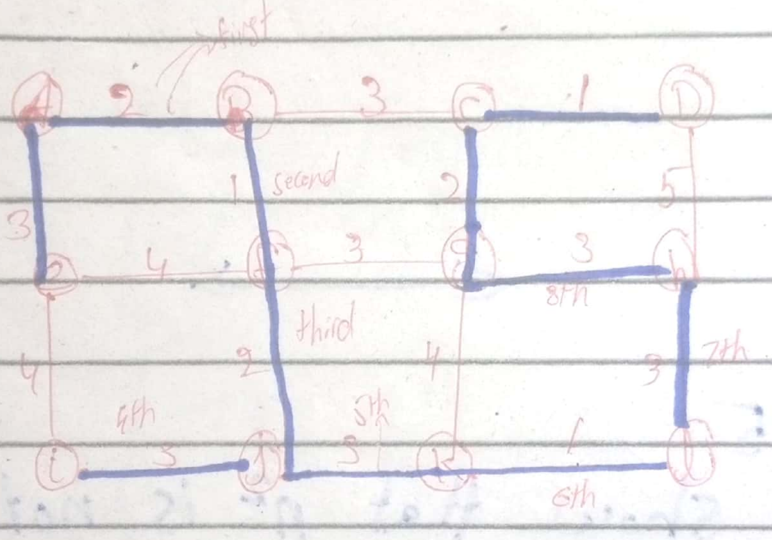
Date:

Long

Q.4 prime find Minimum spaning tree.

Sol



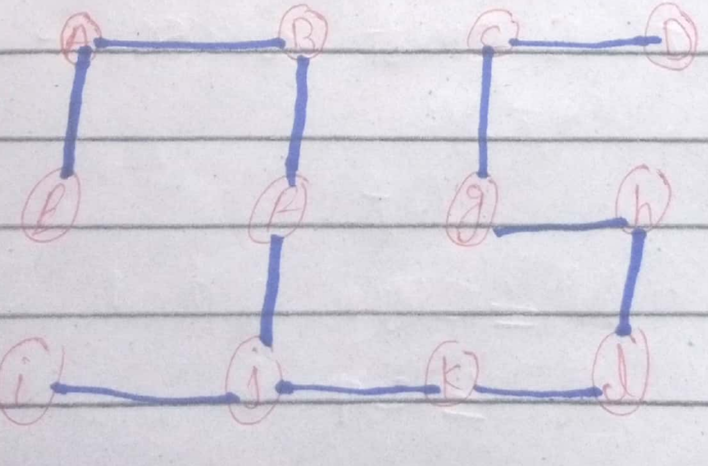
Minimum spaning tree Adjacent

Source A

~~2~~, 3, 3, ~~1~~, 4, 3, ~~2~~, ~~2~~, 3, 4, 4, ~~1~~, ~~2~~, ~~3~~, 5

~~2~~, 3, 4, ~~1~~, 3

So the spanning tree



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So the edges in the spaning tree is less than the vertex

edges = (vertex) - 1
= 12 - 1 = 11

Hence prove that this is spaning tree that having 11 edges.

Q.5

Show that n^2 is not $O(n)$

use the proof by contradiction
: Assume that
$n^2 = O(n)$ in which
$\forall n \geq 1$ then the
constant c exist $c < \infty$
Such that

$n^2 \leq c(g(n))$
$n^2 \leq cn$

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$\div$ by n b/s

$$\frac{n^2}{n} \le \frac{cn}{n}$$

$$n \le c$$

Since the inequality should hold for all n and it does not hold $n = c+1$, then there is a contradiction in the initial assumption.

Therefore $n^2 \ne O(n)$

Because in which

$n \le c$

so fail this condition

$\forall n \ge 1$

Hence $c < \infty$

But n is less than occure in this condition

Hence $n^2 \ne O(n)$

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b)

function $\mathbb{R}$ to $\mathbb{R}$ with
$f(x) = x^2$
Is invertible f

Now first we check this function, is one-to-one function and than check onto function

one-to-one

$f(x_1) = f(x_2)$

$x_1^2 = x_2^2$

Taking square of b/s

$\sqrt{x_1^2} = \pm\sqrt{x_2^2}$

$x_1 = \pm x_2$

$x_1 = x_2 \qquad x_1 = -x_2$

so this is not one to one function because

$x_1 \neq x_2$

Example Let

$f(x_1) = x^2$ put 1

$f(1) = (1)^2 = 1$

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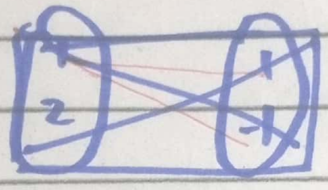
$f(x_2) = x^2$ put -1

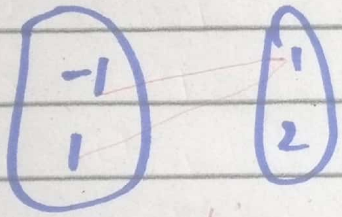
$f(-1) = (-1)^2 = 1$

so $f(x_1) = f(x_2)$

$1 \neq -1$

~~but~~ That give the same result to the different value.





This is not one to one function.

check onto

Let $f(x) = y$ $y \in R$

R is real no.

$y = x^2$

$x = \pm\sqrt{y}$

That give the different value of the y so this is not onto function because

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$x = \sqrt{y}$ put real number

no = -3

$x = \sqrt{-3}$

In square root negative variable are not the real it is a complex number not the real

$x = \sqrt{3}\, i$

so $x \notin R$ this is reason this function is not onto function.

Invertible

If the function is not one-to-one and onto so it is not ~~inver~~ invertible function.

It is impossible to take the inverse of this function.

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Q.6

a)

$a_n = a_{n-1} + 3$

$n = 1, 2, 3, \ldots$

that

$a_0 = 2$

$a_1 = ?$ $a_2 = ?$ $a_3 = ?$

sol

$a_n = a_{n-1} + 3$

for a_1

$a_1 = a_{1-1} + 3$

$a_1 = a_0 + 3$

we know that $a_0 = 2$

$a_1 = 2 + 3$

$\boxed{a_1 = 5}$

for a_2

$a_n = a_{n-1} + 3$

$a_2 = a_{2-1} + 3$

$a_2 = a_1 + 3$

we know that $a_1 = 5$

$a_2 = 5 + 3$

$\boxed{a_2 = 8}$

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For a_3

$a_n = a_{n-1} + 3$

$a_3 = a_{3-1} + 3$

$a_3 = a_2 + 3$

we know that

$a_2 = 8$

$a_3 = 8 + 3$

$\boxed{a_3 = 11}$

So the result is

$\boxed{5, 8, 11}$