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HIGHLIGHTED HANDOUT

MTH621

Real Analysis I

MTH621 by VU Learning HUB

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Question # 1 of 10 (Start time: 08:10:51 PM, 07 November 2017)

Which one is not an initial segment of $\mathbb{N}$

Select the correct option

☐	$\{1, 2, 3, \dots, 30\}.$ <i>AHMAD MSC(MATH)</i> <i>Areeb2113@gmail.com</i>
☐	$\{1, 2, 3, \dots, 100, 101, 102, 103\}.$
☐	$\{1, 2, 3\}.$
☒	$\{2, 4, 6\}.$

The supremum of the set $B = \{p \in \mathbb{Q} : p^2 < 3\}$ is

▶ Select the correct option

☐	$\sqrt{2}.$ <i>AHMAD MSC(MATH)</i> <i>Areeb2113@gmail.com</i>
☐	$\sqrt{3}.$
☐	10.
☐	19.

Question # 3 of 10 (Start time: 08:12:24 PM, 07 November 2017)

The union of set of rational numbers and the set of irrational numbers is

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Select the correct option



The set $\{n \in \mathbb{Q} : x^7 - 10x + 30 = 0\}$.



The set of integers.



The set of natural numbers.



$\mathbb{R}$, the set of real numbers.

Question # 4 of 10 (Start time: 08:13:00 PM, 07 November 2017)

The supremum of the set $E_2 = \{1/n : n \in \mathbb{N}\}$ is

Select the correct option

☐	5	<i>AHMAD MSC(MATH)</i> <i>Areeb2113@gmail.com</i>
☒	1	
☐	7	
☐	4	

Question # 5 of 10 (Start time: 08:13:37 PM, 07 November 2017)

Identify the false statement(s)

Select the correct option



The set of natural numbers is not complete.

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The set of rational numbers is complete



The set of rational numbers is an infinite set.



The set of real numbers is complete.

The infimum of set of integers is

Select the correct option

☐	$-\infty$	<i>AHMAD MSC(MATH)</i> <i>Areeb2113@gmail.com</i>
☒	∞	
☐	-100	
☐	10	



The statement(s) true about the real number $4\sqrt{10}$ is(are)

Select the correct option



is a rational number.

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an irrational number.



the solution of $x^2 - 2x + 3$.



the solution of $x^2 - 4 = 0$.



Which statement(s) is(are) true

Select the correct option



The set of even numbers is defined as $\{2k - 1 : k \in \mathbb{N}\}$.

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The set of odd numbers is defined as $\{2k : k \in \mathbb{N}\}$.



Both set of even numbers and set of odd numbers are countable.



The set of even numbers is a finite set.

Which set is dense in the of real number

Select the correct option



The set of integers.

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The set of rational numbers.



The set $[0, 1]$.



All of the above.

Which one is an irrational number

Select the correct option



$$\frac{22}{7}$$

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$$\pi$$



$$\frac{p+q}{pq}$$
, where p, q are nonnegative integers.



$$\sqrt{s}$$
, where s is a perfect square.

Question # 1 of 10 (Start time: 10:45:18 PM, 16 May 2018)

Which statement is true about the sets $\mathbb{N}$ and $\mathbb{Q}$

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Select the correct option

☐	$\mathbb{N} = \mathbb{Q}$
☐	$\mathbb{Q} \subset \mathbb{N}$.
☒	$\mathbb{N} \subset \mathbb{Q}$.
☐	None of the above.

Click t

Which statement(s) is(are) true

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Select the correct option



The set of even numbers is defined as $\{2k - 1 : k \in \mathbb{N}\}$.



The set of odd numbers is defined as $\{2k : k \in \mathbb{N}\}$.



Both set of even numbers and set of odd numbers are countable.



The set of even numbers is a finite set.

The supremum of the set $E_2 = \{1/n : n \in \mathbb{N}\}$ is

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Select the correct option

☐	5
☒	1
☐	7
☐	4

Click

The supremum of the set $B = \{p \in \mathbb{Q} : p^2 < 3\}$ is

Select the correct option



$\sqrt{2}$.

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$\sqrt{3}$.



10.



19.

The union of set of rational numbers and the set of irrational numbers is

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Select the correct option



The set $\{n \in \mathbb{Q} : x^7 - 10x + 30 = 0\}$.



The set of integers.



The set of natural numbers.



$\mathbb{R}$, the set of real numbers.

The infimum of the set $E_2 = \{1/n : n \in \mathbb{N}\}$ is

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Select the correct option



-1.



2.



-3.



0.

The statement(s) true about the real number $4\sqrt{10}$ is(are)

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Select the correct option



is a rational number.



an irrational number.



the solution of $x^2 - 2x + 3$.



the solution of $x^2 - 4 = 0$.

The intersection of set of odd numbers and the set of even numbers is

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Select the correct option

☐	The set of rational numbers.
☒	The empty set.
☐	$\{1, 2, 3, 4\}$.
☐	The set of real numbers.

Question # 10 of 10 (Start time: 10:49:12 PM, 16 May 2018)

Identify the false statement(s)

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Select the correct option



The set of natural numbers is not complete.



The set of rational numbers is complete



The set of rational numbers is an infinite set.



The set of real numbers is complete.

Which statement(s) is(are) true about the following sequence $s_0 = 1$ and $s_n = 1 - e^{-s_{n-1}}$

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Select the correct option



$0 < s_n \leq 1$ for all n .



$s_{n+1} - s_n = -(e^{-s_n} - e^{-s_{n-1}})$.



Sequence is convergent.



All of the above.

Warid

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quiz.vu.edu.pk/QuizQuestion.asp

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⋮

MC170403773: HUMA JAVED

Time Left 86 sec(s)

MTH621: Quiz 1

Quiz Start Time: 08:30 PM, 14 May 2018

Question # 4 of 10 (Start time: 08:31:44 PM, 14 May 2018)

Total Marks: 1

Which statement is true about the sets $\mathbb{N}$ and $\mathbb{Q}$

Select the correct option

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Reload Math Equations

☐	$\mathbb{N} = \mathbb{Q}$
☐	$\mathbb{Q} \subset \mathbb{N}$
☐	$\mathbb{N} \subset \mathbb{Q}$
☐	None of the above.

100% correct answers (0/0) (0/0)

Question # 2 of 10 (Start time: 02:07:17 PM, 20 November 2017)

If the sequence is increasing, then it

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▶ Select the correct option



converges to its supremum.



diverges.



may converges to its supremum.



is bounded.

Which of the following given sets is compact subset of $\mathbb{R}$.

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Select the correct option



$(1,5]$



$\{1,2,4\}$



$[0,1]$



$(2,3)$

Identify the identical sequences.

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Select the correct option



$$\left\{ \frac{1}{n^2-2} \right\}_3^\infty \text{ and } \left\{ \frac{1}{n} \right\}_1^\infty.$$



$$\left\{ \frac{1}{n} \right\}_3^\infty \text{ and } \left\{ \frac{1}{n} \right\}_1^\infty.$$



$$\left\{ \frac{1}{n-2} \right\}_3^\infty \text{ and } \left\{ \frac{1}{n^2} \right\}_1^\infty.$$



$$\left\{ \frac{1}{n-2} \right\}_3^\infty \text{ and } \left\{ \frac{1}{n} \right\}_1^\infty.$$

Which statement(s) is(are) true about the following sequence $s_0 = 1$ and $s_n = 1 - e^{-s_{n-1}}$

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Select the correct option

☐	$0 < s_n \leq 1$ for all n .
☐	$s_{n+1} - s_n = -(e^{-s_n} - e^{-s_{n-1}})$.
☐	Sequence is convergent.
☒	All of the above.



$\limsup_{n \rightarrow \infty} s_n = \infty$ if

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Select the correct option



$\{s_n\}$ is not bounded above.



$\{s_n\}$ has unique limit.



$\{s_n\}$ is convergent.



$\{s_n\}$ has limit inferior.



The series $\sum_{n=0}^{\infty} r^n$, $-1 < r < 1$, is

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Select the correct option

☒	divergent.
☐	convergent and converges to $\frac{1}{1+r^2}$.
☐	convergent and converges to 5.
☐	convergent and converges to $\frac{1}{1-r}$.

The set of terms of $\{s_{n_k}\}$ is contained in the set of terms of $\{s_n\}$ implies

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Select the correct option



$$\sup\{s_n\} = \sup\{s_{n_k}\}.$$



$$\sup\{s_n\} \leq \sup\{s_{n_k}\}.$$



$$\sup\{s_n\} \geq \sup\{s_{n_k}\}.$$



$\{s_n\}$ is convergent.

Every Cauchy sequence has a

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▶ Select the correct option



convergent subsequence.



increasing subsequence.



decreasing subsequence.



positive subsequence.

Question # 10 of 10 (Start time: 02:15:53 PM, 28 November 2017)

The limit of the sequence

$$s_n = \frac{1}{n} + \frac{2(1 + 3/n)}{1 + 1/n}.$$

Select the correct option

☐	1	<i>AHMAD MSC(MATH)</i> <i>Areeb2113@gmail.com</i>
☐	4	
☐	3	
☒	2	



If $p > 0$ and α is real, then value of the

$$\lim_{n \rightarrow \infty} \frac{n^\alpha}{(1+p)^n},$$

Select the correct option

☐	∞ .
☐	3.
☐	2.
☒	0.

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The value of the

$$\lim_{n \rightarrow \infty} \frac{1}{n^p}$$

Select the correct option

☒	$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 0$ for $p > 1$.	<i>AHMAD MSC(MATH)</i> <i>Areeb2113@gmail.com</i>
☐	$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 3$ for all p .	
☐	$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 1$ for all p .	
☐	$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 1$ for $p > 1$.	



Question # 3 of 10 (Start time: 09:47:35 PM, 30 November 2017)

If the sequence is convergent then

Select the correct option

- | | | |
|----------------------------------|---|--|
| ☐ | it has two limits. | <i>AHMAD MSC(MATH)</i>
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| ☒ | it is bounded. | |
| ☐ | it is bounded above but may not be bounded below. | |
| ☐ | it is bounded below but may not be bounded above. | |

Which statement(s) is(are) true about the following sequence $s_0 = 1$ and $s_n = 1 - e^{-s_{n-1}}$

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Select the correct option

☐	$0 < s_n \leq 1$ for all n .
☐	$s_{n+1} - s_n = -(e^{-s_n} - e^{-s_{n-1}})$.
☐	Sequence is convergent.
☒	All of the above.

The series $\sum_{n=0}^{\infty} r^n$, $-1 < r < 1$, is

Select the correct option



divergent.

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convergent and converges to $\frac{1}{1+r^2}$.



convergent and converges to 5.



convergent and converges to $\frac{1}{1-r}$.



Which sequence is bounded

Select the correct option

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$$s_n = [1 + (-1)^n]n.$$



$$\{(-1)^n\}.$$



$$\{n\}.$$



$$\{\frac{1}{n} + n^2\}.$$



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The value of the $\lim_{n \rightarrow \infty} \frac{1}{n^p}$ is

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Select the correct option



$$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 0 \text{ for } p > 0.$$



$$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 3 \text{ for all } p.$$



$$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 1 \text{ for all } p.$$



$$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 1 \text{ for all } p > 1.$$



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Every Cauchy sequence has a

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Select the correct option



convergent subsequence.



increasing subsequence.



decreasing subsequence.



positive subsequence.



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Question 7 of 15 (Start time: 00:00:11, 00 November 2017)

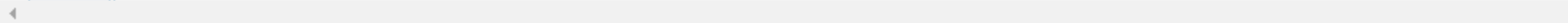
Which statement(s) is(are) true for the following sequence $\lim_{n \rightarrow \infty} \sqrt[n]{n}$

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Select the correct option

☐	The sequence is oscillatory.
☒	The sequence converges to 1.
☐	The sequence converges to 0.
☐	The sequence is divergent to



Which of the following given sets is compact subset of $\mathbb{R}$.

Select the correct option

☐	(1.5]	<i>AHMAD MSC(MATH)</i> <i>Areeb2113@gmail.com</i>
☐	{1.2.4}	
☒	[0.1]	
☐	(2.3)	



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The infimum of set of integers is:

Select the correct option

☒	$-\infty$
☐	∞
☐	-100
☐	10

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The supremum of a set is

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Select the correct option



not unique.



the greatest upper bound of that set.



least upper bound.



None of the above.

The infimum of the set $B = \{p \in \mathbb{Q} : p^2 > 2\}$ is

Select the correct option

☐	$\sqrt{2}$.
☐	$\sqrt{10}$.
☐	$\sqrt{5}$.
☐	1.

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The infimum of the set $B = \{p \in \mathbb{Q} : p^2 > 2\}$ is

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Select the correct option.

☐	$\sqrt{2}$
☐	$\sqrt{10}$
☐	$\sqrt{5}$
☐	3

Click to Save Answer

The infimum of the set $E_2 = \{1/n : n \in \mathbb{N}\}$ is

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Select the correct option

☐	-1.
☐	2.
☐	-3.
☒	0.

Identify the countable set

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Select the correct option

☐	The set of irrational numbers.
☐	The interval $[0, 1]$.
☐	$\mathbb{N} \times \mathbb{N}$.
☐	The interval $[1, 2]$.

Question # 3 of 10 (Start time: 08:47:49 PM, 14 May 2018)

Identify the false statement(s)

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Select the correct option



The set of natural numbers is not complete.



The set of rational numbers is complete



The set of rational numbers is an infinite set.



The set of real numbers is complete.

[Click to Save Answer & Move](#)

The intersection of set of odd numbers and the set of even numbers is

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Select the correct option

☐	The set of rational numbers.
☒	The empty set.
☐	$\{1, 2, 3, 4\}$.
☐	The set of real numbers.



MC170400773: HUMA JAVED

MTH621:Quiz 1

Question # 5 of 10 (Start time: 08:32:36 PM, 14 May 2018)

The union of set of rational numbers and the set of irrational numbers is

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Select the correct option

☐	The set $\{n \in \mathbb{Q} : x^7 - 10x + 30 = 0\}$.
☐	The set of integers.
☐	The set of natural numbers.
☐	$\mathbb{R}$, the set of real numbers.

The supremum of the set $B = \{p \in \mathbb{Q} : p^2 < 3\}$ is

Select the correct option

☐	$\sqrt{2}$.	<i>AHMAD MSC(MA)</i> <i>Areeb2113@gmail.com</i>
☐	$\sqrt{3}$.	
☐	10.	
☐	19.	

Question # 7 of 10 (Start time: 08:34:21 PM, 14 May 2018)

The sum of a rational number and an irrational number is

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Select the correct option

☐	may be a rational depends on the numbers.
☐	always an irrational number.
☐	always a rational number.
☐	may be an irrational number depends on the numbers.

Question # 7 of 10 (Start time: 08:34:21 PM, 14 May 2018)

The sum of a rational number and an irrational number is

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Select the correct option

☐	may be a rational depends on the numbers.
☐	always an irrational number.
☐	always a rational number.
☐	may be an irrational number depends on the numbers.

Next

An upper bound for the set $A = \{p \in \mathbb{Q} : p^2 < 2\}$ is

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Select the correct option

☐	-1
☐	0
☐	4
☐	-4

CRAS

Question # 1 of 10 (Start time: 08:30:27 PM, 14 May 2018)

The supremum of the set $S_2 = \{1/n : n \in \mathbb{N}\}$ is*AHMAD MSC(MATH)**Areeb2113@gmail.com*

Select the correct option

☐	5
☐	1
☐	7
☐	4

ANSWER

Question # 3 of 10 (Start time: 08:31:17 PM, 14 May 2018)

The infimum of the set $E_2 = \{1/n : n \in \mathbb{N}\}$ is

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Select the correct option

☐	-1.
☐	2.
☐	-3.
☒	0.

Question # 2 of 10 (Start time: 08:30:45 PM, 14 May 2018)

An upper bound for the set $A = \{p \in \mathbb{Q} : p^2 < 2\}$ is

Select the correct option

☐	-1.	<i>AHMAD MSC(MATH)</i> <i>Areeb2113@gmail.com</i>
☐	0.	
☒	4.	
☐	-4.	

The value of the $\lim_{n \rightarrow \infty} \frac{1}{n^p}$ is

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Select the correct option



$$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 0 \text{ for } p > 0.$$



$$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 3 \text{ for all } p.$$



$$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 1 \text{ for all } p.$$



$$\lim_{n \rightarrow \infty} \frac{1}{n^p} = 1 \text{ for all } p > 1.$$



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(22)

ABP's Test

Series $\sum a_n b_n$ Converges.

if $a_{n+1} \leq a_n$ For $n \geq k$

$\lim_{n \rightarrow \infty} a_n = 0$ and

$$|b_k + b_{k+1} + \dots + b_n| \leq M, n \geq k$$

Q#1:- Cauchy convergence criterion - (5)

Q#2:- $\sqrt{8}$ is always irrational number (5)

Q#3:- Show that $(n - n^2)$ converges or diverges. (2)

Q#3:- Give an example of subsequence which does not converges but its subsequence does converges: (3)

Q#4:- $S \supseteq (-\infty, -1) \cup (1, 2) \cup (3)$ give all limit points of S . (3)

Q#5:- $\{S_n\} = \left\{\frac{1}{n}\right\} = \left\{1 + \frac{1}{2}, \frac{1}{3}, \dots\right\}$
write subsequence :- (2)

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Mth621 my today's paper

1) state convergence sequence

2) is irrational is countable

3) check convergence of series

Long

4) $\sqrt{8}$ is irrational prove

5) prove "e"

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Mth621

Mcqs conceptual th

Infimum definition

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Series power

Bounded sequence thrm tha...

Underroot 8 rational hai yh prove
krna tha 5 marks

RABEES TEST 5 marks

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Write any subsequence of sequence $1/n^2$
2marks

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Define infimum 2marks

Discuss series convergent or divergent $(n/2 + 1/n)$
3marks

Cauchy's criterion state and proof 5

Aik theorem that you know or not 5 marks
that

Mcqs were v-tough and
only two mcqs from quiz.

- 1) Sequence Given thi uski Limit
find krni thi- (2)
- 2) Power Series def. (2)
- 3) Prove that Convergent Series
is bounded. (3)
- 4) Define Limit inferior for S_n - (3)
- 5) Find the approximation of e - (5)
- 6) Principle of mathematical
induction se 1 question- (5)