MONROE COMMUNITY COLLEGE

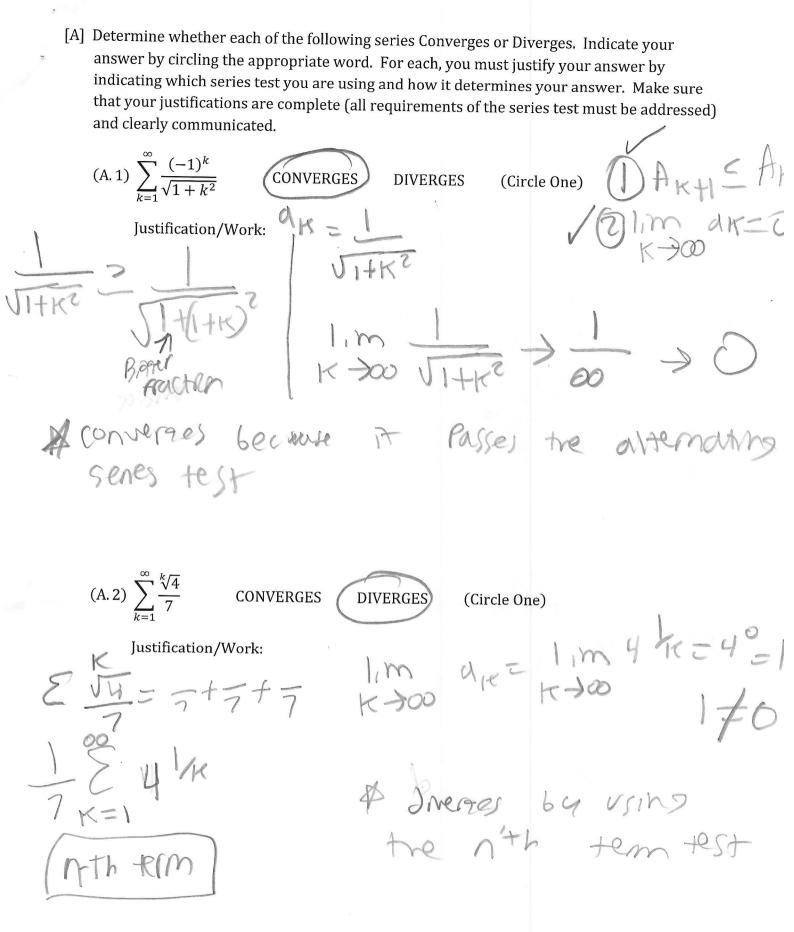
MTH 211 – SLN Unit 3 Written Assignment

Printed Name:	Moer mustres	_

*See Blackboard for the deadline for submitting your assignment.

Directions:

- Be sure to follow the submission instructions given in Blackboard when submitting your completed assignment. Do NOT email me your completed assignment.
- Only methods covered in this course up to the current unit may be used on this assignment.
- In all problems you must show sufficient work to support your final answers. All such work must be done in this assignment document. If additional space is needed, you may add pages, but your work must be submitted in order.
- The work you submit must be your own. While I cannot prevent students from
 discussing problems, suspicion of duplicated work will be investigated and
 penalties may result. In addition, solutions taken from online calculators
 or the equivalent will be not be accepted and will be considered
 cheating.
- Be sure to include this page as a cover page for your assignment when
 you submit it and please make sure your name is written in the
 designated spot above. If you do not have access to a printer, you may
 write your solutions on regular paper, but each page must consist of
 solutions to only those problems on the corresponding page of the
 original exam.



(A.3)
$$\sum_{k=1}^{6} \frac{6}{\sqrt{k^2}}$$
 CONVERGES (DIVERGES) (Circle One)

Justification/Work:

 $K = 1 + \frac{2}{\sqrt{3}}$
 $K = 1 + \frac{2}{\sqrt{3}}$

When $P = 1$ it diverges

(A.4) $\sum_{k=1}^{6} \frac{(k+1)!}{k \cdot 2^k}$ CONVERGES (DIVERGES) (Circle One)

Justification/Work: The PAHD HST

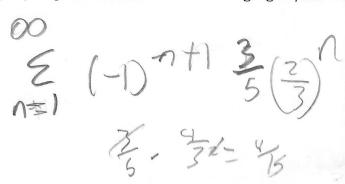
 $K = 1 + \frac{1}{\sqrt{3}}$
 $K = 1 + \frac{1}{\sqrt{3}$

DIVERGES (Circle One) Justification/Work: f(K)= are = n the sum would also be finite Both would converse CONVERGES DIVERGES (Circle One) (A. 6) $\sum_{k=1}^{\infty} \frac{1}{k^3 + \ln k}$ comparison test Justification/Work: 1 = 1 it has to be smaller from finge number-The sum of is i) smaller or eru to a finite number which it must onverge

[B] Consider the following infinite series	Consider the Callerina in City	2	4	8	16	32	
	5	15	$\frac{1}{45}$	135	$\frac{1}{405}$		

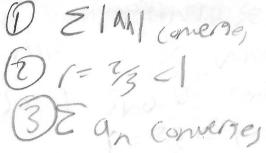
PUND D

(B.1) Express the sum of above using sigma/summation notation (i.e. using Σ).

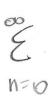


(3) = 3 (45) = 3

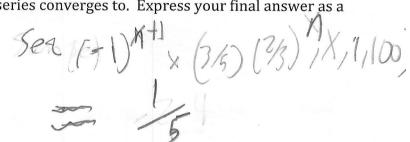
(B.2) Explain how we know the above series converges. Provide a complete justification.



(B.3) Determine the exact value that the series converges to. Express your final answer as a fraction in lowest terms.



11 = 1-V



[C] For any value of *x*, the series below will be geometric. For which values of *x* will the series DIVERGE?

$$\sum_{k=0}^{\infty} \left(\frac{x}{4}\right)^{2k}$$

X 2 4 Z

[D] Consider the following <u>Telescoping Se</u>	<u>ries</u> . (See Example	3b in Section 10.3 of the	ne text for a
similar problem)		3	
	$\sum_{k=1}^{\infty} \frac{3}{9k^2 + 3k - 2}$	->	
	<u> </u>	1.1011	-U+2(3K-1
(D.1) Obtain the partial fraction decom	position for $\frac{3}{9k^2+3}$	$\frac{1}{k-2}$. Show all work!!!)
7 ()	5	A	L R
2.	3K-1) 3K+	2) = (3H)	1
	111 2111	9	1 (SKts)
DK=1 S = AC	3K+2) +	B(3K-1)	
(2) K=2	5A + ZR		7137
	- 8A+5B		133
-8			
A CHARLEST A	cont. or	n seperate	
(D.2) Obtain an explicit formula for S_n (the	ne n^{th} partial sum).	The formula should b	o simplified
so that it does not contain the in	it.	The formula should b	e simplined
5n - 5 ()	1	- [11	16/11
K- (3K-1)	(3/c+2))	- 12-30	171518
M.		+/1	1 + 8
P Conte on	6 ha hu	LI 8 T	1
(D.3) Determine if the series converges of	diverges by calcul	ating the appropriate l	3(n-U+2 +
If the series converges, indicate its s	um. Your solution	must clearly show the	limit being
calculated using limit notation. Be s converges or diverges and clearly in	sure to clearly indic	ate whether or not the	series
and clearly in	dicate the sum of t	ne series.	
lim sh =	im (-	7 - 7	
$n\rightarrow 00$	300	snt2)	
	12)1	
	^		
) ()	14 Conve	cires	

[5 2 3] 5 · R, > 62 [1 3/5] 3/5] --8-R+R2 ->R2 [0 2/5 | 3/5] A = 3 +3 37A= 963=-35 => B=-- 1 3KH - AK+2 (F3K-1) B (3K+2) 25 P 4-21 6

3(n-1)=1 3(n-1)+2

[E] Consid	der the following series.		lima -	B-
		$\sum_{k=1}^{\infty} \frac{(-1)^k \cdot 3^k}{4^k + 1}$	A-B	
(E. 1) S	how that $\lim_{k \to \infty} \frac{3^k}{4^k + 1} =$	0. Your answer must follow	y from a determinate form.	
lir	n 3 K	lin	13/K	
K-)	0) JR(14)	4/4) 1.m 1	4) - (1+)	外
		K-300 1X/		
		0.1=	0	
	IIN	2 3 K	0/	
(E.2) U	se Theorem 10.18 in sec	tion 10.6 of the textbook to	determine the smallest n	
gı	$ R_n < R_n$.001. You may use trial-and	error to come up with the answ	er.
(3)	(1+1/4H).	2 (3) (4)	(1+14KH)	
3) (onverses	N.D. ZALIS	= 201 A Contine	
(E.3) Ca	alculate S., for the value	of n you obtained in (E.2), D	ound your answer to the neares	e 1
th	ousandth. You may use	the <i>sum</i> and <i>seg</i> features of a	ound your answer to the neares [.] a TI Graphing Calculator, Excel,	t
or	any other program for	computing partial sums (try	a web search) for this part	
5	h = 8	1,0 = 3	(-1) 1/3 t	
	K=1	rad Kol	48+1	
(E.4) Is	the annrovimation foun	din (E.2) an array it		
M > 7°			underestimate? Explain why.	
(1) 6)	F	eresmute	JG 117 OV	

In (,001) = (n+1) - 1 m 3/4+ In ((1+ kn+1)) 1=23

[F] The following series satisfies the conditions of the Integral Test and can be shown to converge.

$$s = \sum_{k=1}^{\infty} e^{-k/2}$$

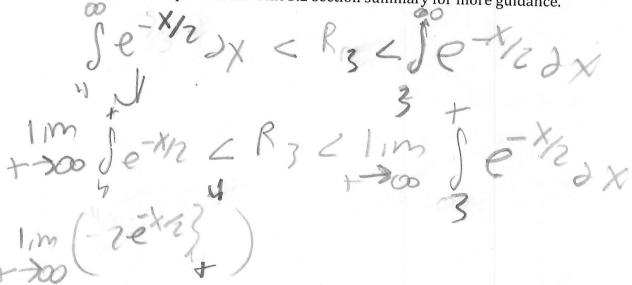
(F.1) Approximate the sum of this series using S_3 . Round to the nearest <u>ten-thousandth</u>.

(F.2) Recall the inequality below that provides upper and lower bounds for R_n .

$$\int_{n+1}^{\infty} f(x) \, dx < R_n < \int_{n}^{\infty} f(x) \, dx$$

Find the values of the integrals above (to the nearest ten-thousandth) to first obtain the specific inequality satisfied by R_3 . Then use your result from (F.1) to obtain an inequality satisfied by S (the infinite sum). Show sufficient work to support your answer. You must handle the improper integrals as we did in Unit 2 (with limits).

**See Example 8 in the Unit 3.2 section summary for more guidance.



Inequality for R_3 : . 7707 $\angle R_3 \angle . 446$ Inequality for S:

1,46826561.6438 (F.3) Convince yourself that that given series is Geometric and then use this fact to determine the EXACT (no decimals) value of the sum. Then approximate the sum by rounding to the nearest ten-thousandth. The result should agree with your inequality in (F.2). Show work to support your answer.

$$S = \frac{e^{-k/2}}{5} =$$

1m +>00 (2-e-2) 2-e+/2) + 200 (2e-x/23) J2-e-% 2,4463 12707 CR3 2 - 4463 R3=5-53 ,2707+1,1975=1,468; - +463+1-1975=1-643P R3+53 = 5 1,4682 < 52 | -6438