Due at the beginning of class on the day of Test 3

Direction: Solve the problems in this worksheet on separate sheets of paper. Write your solution neatly. Use standard size paper. Clearly label each problem, and include each problem in the correct order. No ragged edges. Staple multiple pages. At the top of the first page put your name, Math 2414, and the title of the worksheet. Show all work to justify your answer. Answer with insufficient work will receive no credit.

Find a geometric neuron ganies contained at a fair the given function. Determine the interval of convergen	
r ind a geometric power series centered at α for the given function. Determine the interval of convergen	ce.
1. $f(x) = \frac{1}{3-x}, \alpha = 1.$ 2. $f(x) = \frac{3}{2x-3}, \alpha = -3.$ 3. $f(x) = \frac{3}{3x+4}, \alpha = 0.$	

Fin	ıd	$_{\rm the}$	pai	rtial	frac	$_{ m ctior}$	ı de	com	posi	tion	of	the	func	tion	and	l us	e it	to f	ind	the	pow	er s	eries	for	the	fun	ctio	n ce	nter	ed	
at (0.	De	tern	nine	the	inte	erval	of	conv	erge	ence																				
	1	ala	a) —	_	-2											ი კ	(m)			4x											
	1.	g(x)) =	$\overline{x^2}$	-1^{-1}											2. J	(x)	- :	$x^{2} +$	2x -	-3^{\cdot}										

	Problem 3:	Find	power	series	by	differe	ntiation
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1	Ha	0 t h	0.000				nto	nd	+ 0	for	f(m)		1	+0	Gné			N (10)	ioa	aont	0.000) for		.)	2		(11;	nt.
1.	Us	e th	e po <i>f‼(</i>	wer	Serie Do	es ce	ine.	rea a	at U	ior	f(x)	$j = \frac{1}{2}$	1+:	r^{-to}	nne of t	rap boo	owe	r sei	ries	cent	ereo	at	0 101	g(x)	;) =	(1+	$x)^3$.	(пі	nt:
	g(z	c) =] ((x)).	De	tern	ime	the	mte	rva	01	conv	erge	ence	01 t	ne s	erie	s yo	u 10	una	-								
2.	Us	e th	e po	wer	seri	es ce	ente	red a	at O	for .	f(x)) = -	1 1_/	$\frac{1}{r}$ to	find	l a p	owe	r sei	ries	cent	ered	l at () for	g(x)	c) =	$\frac{1+}{(1-)}$	$\frac{x}{x)^2}$.	(Hi	nt:
	wr	ite g	(x)	as a	sur	n of	two	fun	ctio	ns t	nen	use	diffe	rent	iati	on t	o fin	d th	ie se	ries	for	each	fun	ictio	n).	Det	ermi	ne t	he
	ınt	erva	l of	con	verg	ence	e of	the	serie	es yo	ou fe	ounc	1.																

Pro	bler	n 4	: Fi	nd j	pow		seri	es b	y iı	nteg	grat	ion																		
1.	Fii	nd a	pov	ver s	serie	s ce	nter	ed a	t 1	for	f(x)	= -	1. D	eter	min	e th	e in	terv	al of	cor	iver	renc	e of	the	seri	es v	ou f	oun	d.	
2	Ua	o th	- 	orio	ua r	ort	to f	nd	0.00	auor	Gori		r	rod	ot 1	for	ala) _	ln <i>m</i>	(н	int.) _	ſf	(m)d	~) ~)	Dot		no	
2.	the	e int	e pi erva	l of	con	verg	ence	e of	a po the	serie	es y	ou fo	ound	l.	at 1	101	g(x) —	111 <i>x</i>	. (11	1110.	g(x) —	JJ	(x)u	<i>x</i> .)	Dett		ne	

]	Pro	bleı	n 5:	Us	sing	; sei	ies	for	fun	ictio	\mathbf{ons}	to f	ind	inf	init	e su	\mathbf{ms}													
	1.	In	the	lect	ure	we c	leriv	ed f	ser	ies (ente	ered	at () for	f(3)	r) =		x	T	J se t	his	resu	lt te	, fin	d th	e su	m o	fthe	e ser	ies
		∞		$\langle \alpha \rangle$	n										5.(*		(1 -	-x)	2											
		Σ	n	$\left(\frac{2}{3}\right)$																										
		n=	1	()/																										
	2.	$ In \\ \infty $	the	lect	ure 1	we c	leriv	ed a	ı ser	ies o	ente	ered	at () for	f(x)	c) =	$\ln(1$. <i>+ x</i>	:). T	Jse t	his	resu	lt to) fin	d th	e su	m o	f the	e ser	ies
		\sum	(-1)	$()^{n+}$	$\frac{1}{2^n}$	$\frac{1}{n}$.																								
		<i>n</i> =	1	_		ľ.									a (,												
	3.	ln ∞	the	lect	ure [.] 1	we d	eriv	ed a	ser	ies c	ente	ered	at (for	f(x	:) =	arct	an(x)	<i>x</i>).	Use 1	this	resu	ilt to	o fin	d th	e su	m o	f the	e ser	ies
		Σ	(-1)	$(1)^{n} \frac{1}{2}$	$\frac{1}{n+1}$	1.																								
		n =	0																											