Name: KEY	ID: KEY	Sec: 8(9:00-9:50) 9(10:00-10:50)

MATH-102 Term-152 CQ13 Form B

(show all your work and circle one letter to get a full mark or you will get zero)

1) The interval of convergence of the power series $\sum_{n=1}^{\infty}\frac{(-2)^n}{n}(x-3)^n$ is

10 points

$$R=\lim_{n\to\infty}\left|\frac{(-2)^{n+1}(x-3)^{n+1}}{n}\cdot\frac{(n+1)}{(-2)^n(x-3)^n}\right|=2|x-3|$$

$2|x-3|<1 \Rightarrow |x-3|<1/2 \to (\frac{5}{2}, 7/2)$

$x=\frac{7}{2}\to\sum_{n=1}^{\infty}\frac{(-1)^n2^n}{n}(\frac{1}{2})^n=\sum_{n=1}^{\infty}\frac{(-1)^n}{n}$ conv alt. Harmonic

$x=\frac{5}{2}\to\sum_{n=1}^{\infty}\frac{(-1)^n2^n}{n}(-\frac{1}{2})^n=\sum_{n=1}^{\infty}\frac{(-1)^n2^n}{n}\frac{(-1)^n}{2^n}=\sum_{n=1}^{\infty}\frac{1}{n}$ harmonic div

(a) (5/4 , 7/4]

(b) [5/4 , 7/4]

(c) [5/2 , 7/2]

(d) (5/2 , 7/2)

(e) (5/2 , 7/2]

(f) None of the above

$$\left(\frac{5}{2}, 7/2\right]$$

(TRUE or FALSE) 20 points (4 each)

2) *If the power series* $f(x)=\sum_{n=0}^{\infty}c_n(x+\frac{3}{2})^n$ has radius of convergence R = 2 , then $(-\frac{7}{2},\frac{1}{2})=I$

center $=-3/2 \Rightarrow$ interval $(-\frac{3}{2}-2, -\frac{3}{2}+2)$

	Statement	True or False	Reason
(a)	$\lim_{n\to\infty}\frac{c_n}{2^n}=0$	(T) (F)	$x=-1\in I \Rightarrow \sum_{n=0}^{\infty}\frac{c_n}{2^n}$ conv $\Rightarrow \lim\frac{c_n}{2^n}=0$
(b)	$\lim_{n\to\infty}(-1)^n\left(\frac{5}{2}\right)^n c_n\neq 0$	(T) (F)	$x=-4\notin I \to \sum_{n=0}^{\infty}c_n(-1)^n(\frac{5}{2})^n$ div
(c)	$\sum_{n=1}^{\infty}\frac{nc_n}{2^{n-1}}$ is convergent	(T) (F)	$f'(x)=\sum_{n=0}^{\infty}nc_n(x+\frac{3}{2})^{n-1}$ $x=-1\in I\Rightarrow\sum_{n=0}^{\infty}\frac{nc_n}{2^{n-1}}$ conv
(d)	$\sum_{n=1}^{\infty}nc_n$ is convergent	(T) (F)	let $x=-1/2$ in $f'(x)$ $\sum_{n=0}^{\infty}nc_n$ conv $-1/2\in I$
(e)	$\sum_{n=0}^{\infty}\frac{(-1)^{n+1}c_n}{n+1}$ is divergent	(T) (F)	$\int f(x)\,dx=C+\sum_{n=0}^{\infty}\frac{c_n(x+\frac{3}{2})^{n+1}}{n+1}$

$x=-1/2\in I\to C+\sum_{n=0}^{\infty}\frac{c_n}{n+1}$ conv

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