Day 3 Homework – Deriving and integrating series.
Calculus BC – Unit 3

Find the following. Include a check for convergence at the endpoints of the interval.

	Interval of convergence
$\sum_{n=1}^{\infty} \frac{(-1)^n (x-3)^n}{n}$	
f'(x) =	
$\int f(x)dx =$	

	Interval of convergence
$\sum_{n=0}^{\infty} \frac{x^n}{n!}$	
f'(x) =	
$\int f(x)dx =$	

	Interval of convergence
$\sum_{n=0}^{\infty} \frac{(x+4)^n}{3^n(n+1)}$	
f'(x) =	
$\int f(x)dx =$	

	Interval of convergence
$\sum_{n=1}^{\infty} \frac{(-1)^n (x-5)^n}{n^2}$	
f'(x) =	
$\int f(x)dx =$	

Day 3 Homework – Deriving and integrating series.
Calculus BC – Unit 3

Answers

	Interval of convergence
$\sum_{n=1}^{\infty} \frac{(-1)^n (x-3)^n}{n}$	Radius = 1, Interval: $2 < x \le 4$
f'(x) = $\sum \frac{(-1)^n n(x-3)^{n-1}}{n} = \sum (-1)^n (x-3)^{n-1}$	2 < x < 4
$\int f(x)dx = \frac{(-1)^n (x-3)^{n+1}}{n(n+1)}$	$2 \le x \le 4$
	Interval of convergence
$\sum_{n=0}^{\infty} \frac{x^n}{n!}$	Radius = ∞, Interval: $-\infty < x < \infty$
f'(x) = $\sum \frac{nx^{n-1}}{n!}$	Radius = ∞, Interval: $-\infty < x < \infty$
$\int f(x)dx = \sum \frac{x^{n+1}}{(n+1)n!}$	Radius = ∞, Interval: $-\infty < x < \infty$
	Interval of convergence
$\sum_{n=0}^{\infty} \frac{(x+4)^n}{3^n (n+1)}$	Radius = 3, Interval: $-7 \le x < -1$
f'(x) = $\sum \frac{n(x+4)^{n-1}}{3^n (n+1)}$	Interval -7< x < -1
$\int f(x)dx = \sum \frac{(x+4)^{n+1}}{3^n (n+1)^2}$	Interval $-7 \le x \le -1$

	Interval of convergence
$\sum_{n=1}^{\infty} \frac{(-1)^n (x-5)^n}{n^2}$	Radius = 1, Interval: $4 \le x \le 6$
f'(x) = $\sum \frac{(-1)^n n(x-5)^{n-1}}{n^2} = \sum \frac{(-1)^n (x-5)^{n-1}}{n}$	Interval 4 < x ≤6
$\int f(x)dx = \sum \frac{(-1)^n (x-5)^{n+1}}{n^2 (n+1)}$	$4 \le x \le 6$