PowerSeriesQuestions

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1 Questions

Q1) The series, $\sum_{n=1}^{\infty} \frac{3^n}{n!}(x-\frac{2}{3})^{n-1}$, in the interval $x \in (\frac{1}{3}, 1)$
a) Converges
b) Diverges
c) Neither converges nor diverges
d) Uniformly converges

Q2) The interval of convergence for the series $\sum_{n=0}^{\infty} \frac{(n+1)!}{n}(x-1)^n$
a) $(0, 1]$
b) $\{1\}$
c) (-1,1]
d) $\{0, 1\}$

Q3) The radius of convergence for the series, $\frac{(x-2)}{3!} + \frac{2(x-2)^2}{5!} + \frac{3(x-2)^3}{7!} + ..$ is:
a) 1
b) 4
c) 3
d) 2

Q4) The power series representation for the function, $tan^{-1}(3x)$:(HINT: refer "operations on power series" section)
a) $\sum_{n=0}^{\infty} (-1)^n (3)^{2n+1} \frac{x^{2n+1}}{2n+1}$
b) $\int \sum_{n=0}^{\infty} (-9x^2)^n dx$
c) $\sum_{n=0}^{\infty} (-1)^n (9)^n \frac{x^{2n+1}}{2n+1}$
d) $3\int \sum_{n=0}^{\infty} (-9x^2)^n dx$

Q5) The power series expansion of the function, $ln(1-x) + tan^{-1}(x)$:
a) $2\sum_{n=0}^{\infty} (\frac{x^{4n+1}}{4n+1} + \frac{x^{2n+2}}{2(n+1)})$
b) $\sum_{n=0}^{\infty} (2x^{4n} + x^{2n+1})$
c) $\sum_{n=0}^{\infty} (\frac{2x^{4n+1}}{4n+1} + \frac{x^{2n+2}}{2(n+1)})$

d) $2\sum_{n=0}^{\infty}(x^{4n}+x^{2n+1})$

Key : (a,d), b, d, a, (a,d), c