2^a LISTA DE EDPS

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A) Verifique se as séries abaixo convergem ou divergem, justificando convenientemente:

1) $\sum_{n=1}^{\infty} \frac{n+1}{n(n+2)}$

2) $\sum_{n=1}^{\infty} \frac{\ln(n)}{n}$

3) $\sum_{n=1}^{\infty} \frac{\ln(n)}{n^3}$

4) $\sum_{n=3}^{\infty} \frac{n}{n^2+4}$

5) $\sum_{n=2}^{\infty} \frac{1}{n.\ln^3(\sqrt[7]{n})}$

6) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n+1}+\sqrt{n}}$

7) $\sum_{n=1}^{\infty} \frac{1}{n^2+2\sqrt{n}}$

8) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n+1}-\sqrt{n}}$

9) $\sum_{n=1}^{\infty} \frac{n}{n^4+2\sqrt{n}}$

10) $\sum_{n=1}^{\infty} \frac{n}{n^3+5}$

11) $\sum_{n=1}^{\infty} \frac{n^{9n+1}}{4^{n-4}}$

12) $\sum_{n=1}^{\infty} \frac{7^{n+3}}{n^{3n}}$

13) $\sum_{n=1}^{\infty} \frac{e}{n^{2n}} \frac{n}{2}$

14) $\sum_{n=1}^{\infty} (\frac{n}{2+n^2})^{5n}$

15) $\sum_{n=1}^{\infty} \frac{(-1)^n n}{e^{3n}}$

16) $\sum_{n=2}^{\infty} \frac{1}{(\ln(n))^n}$

17) $\sum_{n=1}^{\infty} \frac{(\ln n)^n}{\sqrt[7]{n^n}}$

18) $\sum_{n=1}^{\infty} (\frac{-1}{n})^n$

19) $\sum_{n=1}^{\infty} \frac{n}{2^n}$

20) $\sum_{n=1}^{\infty} \frac{e^{3n}}{(n+1)!}$

21) $\sum_{n=1}^{\infty} \frac{2^n}{(n+2)!}$

22) $\sum_{n=1}^{\infty} \frac{n}{(2n)!}$

23) $\sum_{n=1}^{\infty} \frac{n^n}{n!}$

24) $\sum_{n=1}^{\infty} \frac{(-1)^n n}{n+2}$

25) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$

26) $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$

27) $\sum_{n=1}^{\infty} \frac{3+\cos(n\pi)}{n^2}$

28) $\sum_{n=1}^{\infty} sen^{10}(\frac{7n!}{n+2}).\frac{3}{n^3}$

29) $\sum_{n=1}^{\infty} \cos^4(\frac{\sqrt{n}\pi+4}{n-5}).\frac{2}{n^3/_2}$

30) $\sum_{n=1}^{\infty} \sqrt[3]{\text{sen}((3n+1)\pi)}.\frac{4}{n^5}$

31) $\sum_{n=2}^{\infty} \frac{2-\text{sen}((3n+1)\pi)}{\sqrt[5]{n^2}}$

32) $\sum_{n=2}^{\infty} \frac{3+\cos((3n+1)\pi)}{\sqrt[5]{n^7}}$

B) Determine se a série é absolutamente convergente, condicionalmente convergente ou divergente, justificando convenientemente:

1) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$

2) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n]_{\mathrm{JJ}}(n)}{n}$

3) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n.5}{n^3+2}$

4) $\displaystyle\sum_{n=3}^{\infty} \frac{(-1)^n n}{n^2+9}$

5) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n.e^{2n}+1}{e^{2n}}$

6) $\displaystyle\sum_{n=1}^{\infty} (-1)^n.(n.5^{-n}\}$

7) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n}\frac{7}{2}$

8) $\displaystyle\sum_{n=1}^{\infty} \frac{(-10)^n}{n!}$

9) $\displaystyle\sum_{n=1}^{\infty} (-1)^n.e^{-n}$

10) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$

11) $\displaystyle\sum_{n=1}^{\infty} (-1)^n.(1+e^{-n}\}$

12) $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{(-5)^n}$

C) Determine o intervalo de convergência e o raio de cada série de potência abaixo:

1) $\displaystyle\sum_{n=0}^{\infty} \frac{1}{n+4}x^n$

2) $\displaystyle\sum_{n=0}^{\infty} \frac{x^n}{n^2+4}$

3) $\displaystyle\sum_{n=0}^{\infty} \frac{n^2}{2^n}x^n$

4) $\displaystyle\sum_{n=1}^{\infty} (-1)^n\frac{x^n}{\sqrt{n}}$

5) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{2n+14}(x+3)^n$

6) $\displaystyle\sum_{n=1}^{\infty} \frac{n^n}{3^{2n}}(x-2)^{5n}$

7) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{4n\sqrt{n}}x^n$

8) $\displaystyle\sum_{n=1}^{\infty} \frac{(n+1)}{n!}(x-2)^n$

9) $\displaystyle\sum_{n=1}^{\infty} \frac{2^n}{(2n)!}x^{3n}$

10) $\displaystyle\sum_{n=1}^{\infty} \frac{n+1}{6^n}(x-4)^{\frac{n}{3}}$

11) $\displaystyle\sum_{n=1}^{\infty} \frac{2}{(-4)^n}x^{2n}$

12) $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{1000^n}.(x+21)^n$

13) $\displaystyle\sum_{n=1}^{\infty} n!.x^n$

14) $\displaystyle\sum_{n=1}^{\infty} \frac{8^n}{3^{2n}}x^n$

15) $\displaystyle\sum_{n=1}^{\infty} \frac{(x+1)^{2n}}{\sqrt{n}}$

16) $\displaystyle\sum_{n=1}^{\infty} \frac{10^n}{(3n+1)!}(x-3)^n$

17) $\displaystyle\sum_{n=1}^{\infty} (-1)^n\frac{3^n}{n!}(x-4)^n$

18) $\displaystyle\sum_{n=1}^{\infty} (-1)^n\frac{e^n}{n^n}(x+6)^n$

D) Encontre a série que representa $f'(x)$e determine seu raio de convergência:

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

2) $f(x) = \sum_{n=0}^{\infty} \frac{2}{(2n)!} x^{3n}$

3) $f(x) = \sum_{n=0}^{\infty} (n+1)(x-1)^n.5^n$

4) $f(x) = \sum_{n=1}^{\infty} \frac{(-.1)^{n-1}}{n 16^n} x^{2n+1}$

5) $f(x) = \sum_{n=2}^{\infty} (x-4)^{2n-3}.(2n-2)!$

E) Sabendo que $\cos \mathrm{x} = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)!} x^{2n}$, encontre a série de potências que representa sen xeo seu raio de convergência.

F) Seja $f(x) = \sum_{n=1}^{\infty} \frac{x^n}{n^2}$ Encontre o intervalo de convergência das séries de potências de $f(x), f'(x) \mathrm{e} f''(x)$.

G) Represente as funções abaixo como série de Taylor ou de Maclaurin em x_0 dado e determine 0 intervalo de convergência da série de potências obtida:

1) $f(x) = e^x$ como série de Taylor com $x_0 = -3$
2) $f(x) = e^{-x}$ como série de Maclaurin $(x_0 = 0)$
3) $f(x) = e^{4x}$ como série de Taylor com $x_0 = -2$
4) $f(x) = \text{In } x$ como série de Taylor com $x_0 = 1$
5) $f(x) = \frac{1}{1+2x}$ como série de Maclaurin $(x_0 = 0)$
6) $f(x) = \frac{1}{(1+x)^2}$ como série de Taylor com $x_0 = 1$
7) $f(x) = 7^x$ como série de Maclaurin $(x_0 = 0)$.