Find the limit of the given sequence.

$$a_n = \frac{3n}{n+2}$$

$$\lim_{n \to \infty} a_n = \boxed{3}$$

used Lhopitals rule

2. value: 10.00 points

Determine whether the sequence converges or diverges.

$$a_n = \frac{n!}{10^n}$$

- A. The sequence diverges.
- B. The sequence converges.

1*2*3*4....*10*11
10* 10 *

ratio test $\lim_{n \to \infty} \left| \frac{(n+1)\cancel{!}}{10^{\cancel{(n+1)}}} \cdot \frac{\cancel{10^n}}{\cancel{n!}} \right| = \infty > 1$

diverges by the ratio test

3. value: 10.00 points

Determine whether the series converges or diverges. For convergent series, find the sum of the series.

$$\sum_{k=0}^{\infty} (-1)^{k+1} \frac{9k}{k+7}$$

- A. The series converges to 9.
- B. The series diverges.

alternating Series Test

diverges by ...the divergence test

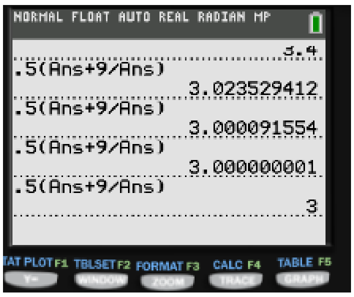
lim an = 9

4. value: 10.00 points

Question

Suppose that $a_1 = 5$ and $a_{n+1} = \frac{1}{2}\left(a_n + \frac{9}{a_n}\right)$. Determine the value to which the sequence converges.

The sequence converges to 3 .



5. value: 10.00 points

Determine the convergence or divergence of the series.

$$\sum_{k=1}^{\infty} \frac{3k^5}{k^{11/2}+2}$$

- A. The series is convergent.
- B. The series is divergent.

use limit comparison test

$b_k=3/k^{\wedge}.5$ which by the p-series (p=.5) this diverges

$\frac{1}{K^n}$ $n>1$ ☺ $n\leq 1$ ☹

$$\lim_{k\to\infty}\left|\frac{\frac{3k^5}{k^{11/2}+2}}{3/k^{\wedge}.5}\right| = 1$$

$$\lim_{k\to\infty}\left|\frac{3k^5}{k^{11/2}+2}\cdot\frac{k^{1/2}}{3}\right| = 1$$

converge/diverge

$$\frac{k^5}{k^{5.5}} = k^{-.5} = \frac{1}{k^{.5}}$$

$$\frac{x^n}{x^m} = x^{n-m}$$

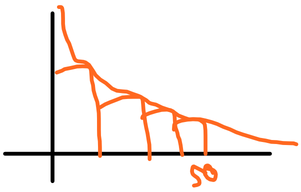
6. value: 10.00 points

Question

Estimate the error in using the indicated partial sum S_n to approximate the sum of the series. Give your final answer in scientific notation with three decimal places.

S_{50}, $\sum_{k=1}^{\infty} \frac{33}{k^8}$

$R_{50} \leq$ ______ $\times 10$ (select)



$$\int_{50}^{\infty} 33k^{-8}\,dk$$

$$\lim_{B\to\infty} \frac{33k^{-7}}{-7}\Big|_{50}^{\infty}$$

$$-\frac{33(50)^{-7}}{-7} = 6.034 \times 10^{-12}$$

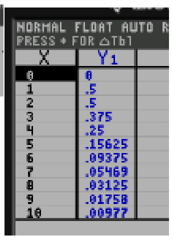
7. value: 10.00 points

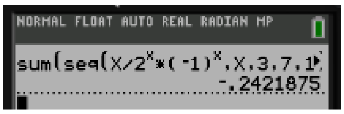
Use the method of partial sums to estimate the sum of the convergent series to within 0.041. Round your final answer to two decimal places.

$\sum_{k=3}^{\infty} (-1)^k \frac{k}{2^k}$

$S \approx$ ______

$$\frac{k}{2^k} < .041$$





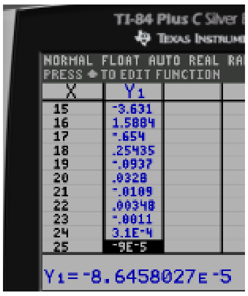
8. value: 10.00 points

Question

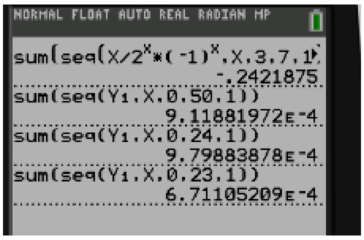
Determine how many terms are needed to estimate the sum of the series to within 0.0001.

$$\sum_{k=0}^{\infty} (-1)^k \frac{7^k}{k!}$$

Your Answer: 24



24



9. value: 10.00 points

Determine whether the series is absolutely c divergent.

$$\sum_{k=2}^{\infty} (-1)^{k+1} \frac{k!}{2^k}$$

- A. Converges absolutely
- B. Converges conditionally
- C. Not enough information
- D. Diverges

ratio test $\lim_{k\to\infty} \left| \frac{(K+1)!\ \ 2^K}{2^{(K+1)}\ K!} \right| = \infty > 1$

diverges by the ratio test

10. value: 10.00 points

True or false?

$\sum_{k=0}^{\infty} \left(\frac{(-6)^k (k+3)}{30^k}\right)$ converges absolutely.

True False

ratio $\rho = \lim_{k\to\infty} \left| \frac{\cancel{6^{(k+1)}}(k+4)\ \cancel{30^k}}{\cancel{30^{(k+1)}}\ \cancel{6^k}\ (k+3)} \right|$

$\lim_{k\to\infty} \frac{1}{5} \left| \frac{k+4}{k+3} \right| \nearrow = \frac{1}{5} < 1$

converges absolutely by ratio test

12. value: 0.00 points

Simplify your answer.

Determine the interval and radius of convergence for the given power series.

$\sum_{k=0}^{\infty} (10x+5)^k$

The interval is (-.6 , -.4). The radius is r = .1

root test says: $|10x+5| < 1$

$-1 < 10x+5 < 1$

$-6 < 10x < -4$

$-.6 < x < -.4$

check it out...

$10x+\cancel{5} = 1 \quad \sum 1$

$10x + \cancel{5} = -1 \quad |-1|+1$

11. value: 0.00 points

Determine the radius and interval of convergence for the series

$$\sum_{k=0}^{\infty} \frac{8k}{8^k} x^k.$$

The interval is ((-8 , 8)). The radius is r = 8.

Ratio

$$\lim_{k\to\infty} \left| \frac{8(k+1)x^{\cancel{(k+1)}}}{8^{\cancel{(k+1)}}} \cdot \frac{\cancel{8^k}}{8k\ \cancel{x^K}} \right| = \left|\frac{x}{8}\right| < 1$$

$|x| < 8$

If x = 8 $\quad \sum \frac{8k}{\cancel{8^k}} \cdot \cancel{8^k}$ diverging by div test

If x = -8 $\quad \sum 8k(-1)^k$