Chap 11 HW 1 of 2 Sequences and Series (11708644)

Due: Fri, May 31, 2019 12:00 PM MST

Question 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

1. Question Details SCalcET8 11.1.001. [3798853]

(a) What is a sequence?

- A sequence is an unordered list of numbers.
- A sequence is an ordered list of numbers.
- A sequence is the sum of an ordered list of numbers.
- A sequence is the product of an ordered list of numbers.
- A sequence is the sum of an unordered list of numbers.

(b) What does it mean to say that $\lim_{n \to \infty} a_n = 8$?

- The terms a_n approach infinity as n become large.
- The terms a_n approach 8 as n becomes large.
- The terms a_n approach infinity as 8 approaches n.
- The terms a_n approach -infinity as 8 approaches n.
- The terms a_n approach 8 as n becomes small.

(c) What does it mean to say that $\lim_{n \to \infty} a_n = \infty$?

- The terms a_n become small as n becomes small.
- The terms a_n become small as n becomes large.
- The terms a_n become large as n becomes small.
- The terms a_n approach zero as n becomes large.
- The terms a_n become large as n becomes large.

2. Question Details SCalcET8 11.1.005. [3798707]

List the first five terms of the sequence.

$$a_n = \frac{(-1)^{n-1}}{3^n}$$

$a_1 =$ $a_2 =$ $a_3 =$ $a_4 =$ $a_5 =$

3. Question Details SCalcET8 11.1.011. [3799548]

List the first five terms of the sequence.

$$a_1 = 5, \quad a_{n+1} = \frac{a_n}{1 + a_n}$$

$a_1 =$ $a_2 =$ $a_3 =$ $a_4 =$ $a_5 =$

4. Question Details SCalcET8 11.1.016. [3799287]

Find a formula for the general term a_n of the sequence, assuming that the pattern of the first few terms continues. (Assume that n begins with 1.)

$\{1, 3, 5, 7, 9, \ldots\}$

$a_n =$

5. Question Details SCalcET8 11.1.015. [3798222]

Find a formula for the general term a_n of the sequence, assuming that the pattern of the first few terms continues. (Assume that n begins with 1.)

$\left\{-7, \frac{14}{3}, -\frac{28}{9}, \frac{56}{27}, -\frac{112}{81}, \ldots\right\}$

$a_n =$

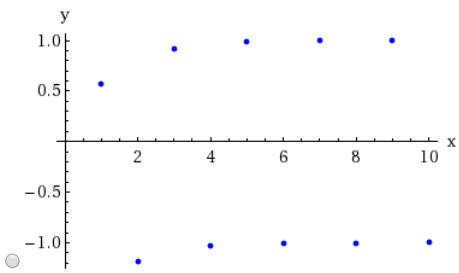
6. Question Details SCalcET8 11.1.021. [3798237]

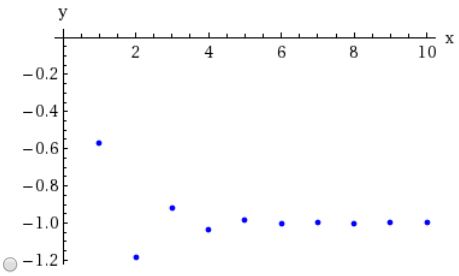
Calculate, to four decimal places, the first ten terms of the sequence.

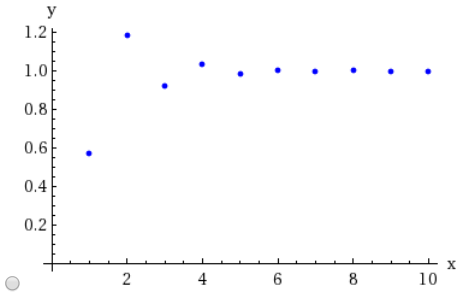
$$a_n = 1 + \left(-\frac{3}{7}\right)^n$$

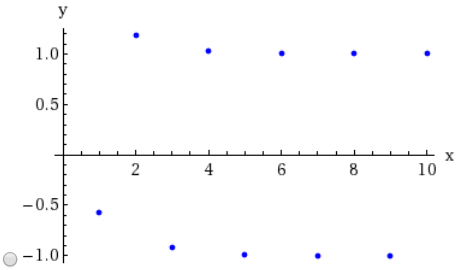
n	a_n
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Using the calculations above, plot the graph of the sequence.









Does the sequence appear to have a limit?

- Yes
- No

If so, calculate it. If not, enter DNE.

7. Question Details SCalcET8 11.1.023.MI.SA. [3798154]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Determine whether the sequence converges or diverges. If it converges, find the limit.

$$a_n = \frac{3 + 13n^2}{n + 11n^2}$$

8. Question Details SCalcET8 11.1.025. [3798883]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

$$a_n = \frac{n^4}{n^3 - 4n}$$

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

9. Question Details SCalcET8 11.1.029. [3798144]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

$$a_n = e^{-7/\sqrt{n}}$$

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

10. Question Details SCalcET8 11.1.038. [3799177]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

$$\left\{\frac{\ln(2n)}{\ln(6n)}\right\}$$

$\lim_{n\to\infty} \left\{\frac{\ln(2n)}{\ln(6n)}\right\} =$

11. Question Details SCalcET8 11.1.043. [3799535]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

$$a_n = \frac{\cos^2(n)}{2^n}$$

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

12. Question Details SCalcET8 11.1.047.MI.SA. [3799114]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Determine whether the sequence converges or diverges. If it converges, find the limit.

$$a_n = \left(1 + \frac{9}{n}\right)^{6n}$$

13. Question Details SCalcET8 11.1.047.MI. [3799176]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

$$a_n = \left(1 + \frac{4}{n}\right)^n$$

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

14. Question Details SCalcET8 11.1.053. [3798239]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

{0, 4, 0, 0, 4, 0, 0, 0, 4, ...}

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

15. Question Details SCalcET8 11.1.054. [3798995]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

$$\left\{\frac{1}{5}, \frac{1}{4}, \frac{1}{6}, \frac{1}{5}, \frac{1}{7}, \frac{1}{6}, \frac{1}{8}, \frac{1}{7}, \ldots\right\}$$

$\lim_{n \to \infty} a_n =$ [ ]

16. Question Details SCalcET8 11.1.064. [3798982]

(a) Determine whether the sequence defined as follows is convergent or divergent.

$a_1 = 1 \quad a_{n+1} = 6 - a_n \quad$ for $n \geq 1$

- convergent
- divergent

(b) What happens if the first term is $a_1 = 3$?

- convergent
- divergent

17. Question Details SCalcET8 11.1.073. [3799145]

Determine whether the sequence is increasing, decreasing, or not monotonic.

$$a_n = \frac{1}{3n + 4}$$

- increasing
- decreasing
- not monotonic

Is the sequence bounded?

- bounded
- not bounded

18. Question Details SCalcET8 11.1.501.XP.MI. [3798740]

Find a formula for the general term a_n of the sequence, assuming that the pattern of the first few terms continues. (Assume that n begins with 1.)

$$\left\{\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \frac{1}{10}, \ldots\right\}$$

$a_n =$ [ ]

19. Question Details SCalcET8 11.1.502.XP. [3799205]

Find a formula for the general term a_n of the sequence, assuming that the pattern of the first few terms continues. (Assume that n begins with 1.)

$$\left\{1, -\frac{1}{5}, \frac{1}{25}, -\frac{1}{125}, \frac{1}{625}, \ldots\right\}$$

$a_n =$ [ ]

20. Question Details SCalcET8 11.1.503.XP. [3798226]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

$a_n = 2 - (0.7)^n$

$\lim_{n \to \infty} a_n =$ [ ]

21. Question Details SCalcET8 11.1.504.XP. [3799172]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

$$a_n = \frac{n^3}{9n^3 + 1}$$

$\lim_{n \to \infty} a_n =$ [ ]

22. Question Details SCalcET8 11.1.505.XP. [3798214]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

$$a_n = \frac{n^3}{7n + 3}$$

$\lim_{n \to \infty} a_n =$ [ ]

23. Question Details SCalcET8 11.1.506.XP. [3798514]

Determine whether the sequence converges or diverges. If it converges, find the limit. (If an answer does not exist, enter DNE.)

$$a_n = e^{8/n}$$

$\lim_{n \to \infty} a_n =$ [ ]

24. Question Details SCalcET8 11.1.507.XP.MI.SA. [3799303]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Determine whether the sequence converges or diverges. If it converges, find the limit.

$$a_n = \frac{8^{n+2}}{9^n}$$

25. Question Details SCalcET8 11.2.001. [3798100]

(a) What is the difference between a sequence and a series?

- A sequence is an unordered list of numbers whereas a series is the sum of a list of numbers.
- A sequence is an ordered list of numbers whereas a series is an unordered list of numbers.
- A series is an unordered list of numbers whereas a sequence is the sum of a list of numbers.
- A sequence is an ordered list of numbers whereas a series is the sum of a list of numbers.
- A series is an ordered list of numbers whereas a sequence is the sum of a list of numbers.

(b) What is a convergent series? What is a divergent series?

- A series is divergent if the nth term converges to zero. A series is convergent if it is not divergent.
- A series is convergent if the sequence of partial sums is a convergent sequence. A series is divergent if it is not convergent.
- A series is divergent if the sequence of partial sums is a convergent sequence. A series is convergent if it is not divergent.
- A convergent series is a series for which $\lim_{n \to \infty} a_n$ exists. A series is convergent if it is not divergent.
- A series is convergent if the nth term converges to zero. A series is divergent if it is not convergent.

26. Question Details SCalcET8 11.2.003. [3798113]

Calculate the sum of the series $\sum_{n=1}^{\infty} a_n$ whose partial sums are given.

$$s_n = 7 - 3(0.7)^n$$

[ ]

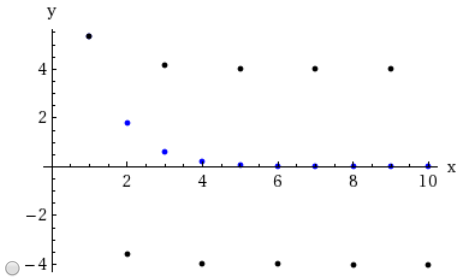
27. Question Details SCalcET8 11.2.009. [3798266]

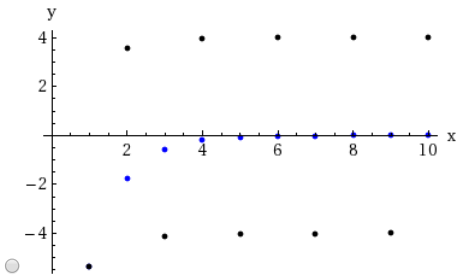
Find 10 partial sums of the series. (Round your answers to five decimal places.)

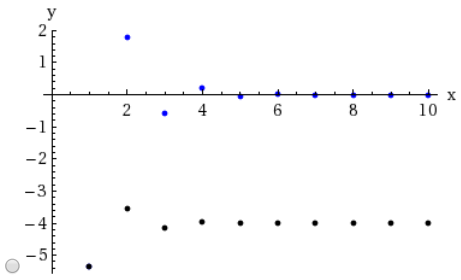
$$\sum_{n=1}^{\infty} \frac{16}{(-3)^n}$$

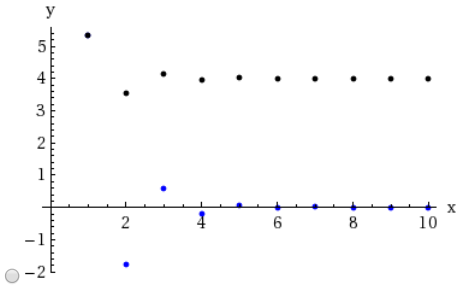
n	s_n
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Graph both the sequence of terms and the sequence of partial sums on the same screen.









Is the series convergent or divergent?

- convergent
- divergent

If it is convergent, find the sum. (If the quantity diverges, enter DIVERGES.)

28. Question Details SCalcET8 11.2.015. [3798788]

Let $a_n = \frac{6n}{2n + 1}$.

(a) Determine whether $\{a_n\}$ is convergent.

- convergent
- divergent

(b) Determine whether $\sum_{n=1}^{\infty} a_n$ is convergent.

- convergent
- divergent

29. Question Details SCalcET8 11.2.017.MI.SA. [3798741]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Determine whether the geometric series is convergent or divergent. If it is convergent, find its sum.

$8 - 9 + \frac{81}{8} - \frac{729}{64} + \cdots$

30. Question Details SCalcET8 11.2.018. [3799329]

Determine whether the geometric series is convergent or divergent.

$7 + 6 + \frac{36}{7} + \frac{216}{49} + \cdots$

- convergent
- divergent

If it is convergent, find its sum. (If the quantity diverges, enter DIVERGES.)

31. Question Details SCalcET8 11.2.023. [3799099]

Determine whether the geometric series is convergent or divergent.

$\sum_{n=1}^{\infty} \frac{(-3)^{n-1}}{7^n}$

- convergent
- divergent

If it is convergent, find its sum. (If the quantity diverges, enter DIVERGES.)

32. Question Details SCalcET8 11.2.027. [3798457]

Determine whether the series is convergent or divergent.

$$\frac{1}{3} + \frac{1}{6} + \frac{1}{9} + \frac{1}{12} + \frac{1}{15} \cdots$$

- convergent
- divergent

If it is convergent, find its sum. (If the quantity diverges, enter DIVERGES.)

33. Question Details SCalcET8 11.2.033. [3799110]

Determine whether the series is convergent or divergent.

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

- convergent
- divergent

If it is convergent, find its sum. (If the quantity diverges, enter DIVERGES.)

34. Question Details SCalcET8 11.2.040. [3799007]

Determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \left(\frac{1}{8^n} + \frac{5}{n} \right)$$

- convergent
- divergent

If it is convergent, find its sum. (If the quantity diverges, enter DIVERGES.)

35. Question Details SCalcET8 11.2.042. [3799511]

Determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{e^n}{n^3}$$

- convergent
- divergent

If it is convergent, find its sum. (If the quantity diverges, enter DIVERGES.)

36. Question Details SCalcET8 11.2.051. [3798486]

Express the number as a ratio of integers.

$0.\overline{4} = 0.4444\ldots$

37. Question Details SCalcET8 11.2.052.MI.SA. [3798260]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Express the number as a ratio of integers.

$0.\overline{61} = 0.61616161\ldots$

38. Question Details SCalcET8 11.2.069. [3798374]

A doctor prescribes a 500-mg antibiotic tablet to be taken every eight hours. Just before each tablet is taken, 20% of the drug remains in the body.

(a) How much of the drug is in the body just after the second tablet is taken? After the third tablet?

second tablet ____ mg

third tablet ____ mg

(b) If Q_n is the quantity of the antibiotic in the body just after the nth tablet is taken, find an equation that expresses Q_{n+1} in terms of Q_n.

$Q_{n+1} =$ ____

(c) What quantity of the antibiotic remains in the body in the long run?

____ mg

39. Question Details SCalcET8 11.2.081. [3798398]

What is wrong with the following calculation?

$$\begin{aligned} 0 &= 0 + 0 + 0 + \cdots \\ &= (1 - 1) + (1 - 1) + (1 - 1) + \cdots \\ &= 1 - 1 + 1 - 1 + 1 - 1 + \cdots \\ &= 1 + (-1 + 1) + (-1 + 1) + (-1 + 1) + \cdots \\ &= 1 + 0 + 0 + 0 + \cdots = 1 \end{aligned}$$

(Guido Ubaldus thought that this proved the existence of God because "something has been created out of nothing.")

40. Question Details SCalcET8 11.3.007. [3798590]

Use the Integral Test to determine whether the series is convergent or divergent.

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

Evaluate the following integral.

$$\int_1^{\infty} \frac{x}{x^2 + 1}\, dx$$

Since the integral ---Select--- finite, the series is ---Select---.

41. Question Details SCalcET8 11.3.008. [3798754]

Use the Integral Test to determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} n^7 e^{-n^8}$$

Evaluate the following integral.

$$\int_1^{\infty} x^7 e^{-x^8}\, dx$$

Since the integral ---Select--- finite, the series is ---Select---.

42. Question Details SCalcET8 11.3.011. [3799081]

Determine whether the series is convergent or divergent.

$$1 + \frac{1}{8} + \frac{1}{27} + \frac{1}{64} + \frac{1}{125} + \cdots$$

- convergent
- divergent

43. Question Details SCalcET8 11.3.014. [3799529]

Determine whether the series is convergent or divergent.

$$1 + \frac{1}{2\sqrt{2}} + \frac{1}{3\sqrt{3}} + \frac{1}{4\sqrt{4}} + \frac{1}{5\sqrt{5}} \cdots$$

- convergent
- divergent

44. Question Details SCalcET8 11.3.021. [3798194]

Determine whether the series is convergent or divergent.

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

- convergent
- divergent

45. Question Details SCalcET8 11.3.024. [3799512]

Determine whether the series is convergent or divergent.

$$\sum_{k=1}^{\infty} ke^{-k^2}$$

- convergent
- divergent

46. Question Details SCalcET8 11.3.027. [3799349]

Consider the following function.

$$f(x) = \frac{9\cos(\pi x)}{\sqrt{x}}$$

What conclusions can be made about the series $\sum_{n=1}^{\infty} \frac{9\cos(\pi n)}{\sqrt{n}}$ and the Integral Test?

- The Integral Test can be used to determine whether the series is convergent since the function is positive and decreasing on $[1, \infty)$.
- The Integral Test can be used to determine whether the series is convergent since the function is not positive and not decreasing on $[1, \infty)$.
- The Integral Test can be used to determine whether the series is convergent since it does not matter if the function is positive or decreasing on $[1, \infty)$.
- The Integral Test cannot be used to determine whether the series is convergent since the function is not positive and not decreasing on $[1, \infty)$.
- There is not enough information to determine whether or not the Integral Test can be used or not.

47. Question Details SCalcET8 11.3.037. [3798208]

Consider the following series.

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

(a) Use the sum of the first 10 terms to estimate the sum of the given series. (Round the answer to six decimal places.)

$s_{10} =$ ☐

(b) Improve this estimate using the following inequalities with $n = 10$. (Round your answers to six decimal places.)

$$s_n + \int_{n+1}^{\infty} f(x)\,dx \le s \le s_n + \int_{n}^{\infty} f(x)\,dx$$

☐ $\le s \le$ ☐

(c) Using the Remainder Estimate for the Integral Test, find a value of n that will ensure that the error in the approximation $s \approx s_n$ is less than 0.0001.

- $n > 0$
- $n > 71$
- $n > 5$
- $n > -71$
- $n > 22$

48. Question Details SCalcET8 11.3.502.XP.MI.SA. [3798697]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Use the Integral Test to determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{14}{n^{13}}$$

49. Question Details SCalcET8 11.3.515.XP.MI.SA. [3798462]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \left(15n^{-2.9} + 10n^{-2.8}\right)$$

50. Question Details SCalcET8 11.3.AE.005. [3798429]

Video Example

EXAMPLE 5

(a) Approximate the sum of the series $\Sigma\ 1/n^9$ by using the first 10 terms. Estimate the error involved in this approximation.

(b) How many terms are required to ensure that the sum is accurate to within 0.0005?

SOLUTION

In both parts (a) and (b) we need to know $\int_n^\infty f(x)\,dx$. With $f(x) = 1/x^9$, which satisfies the conditions of the Integral Test, we have

$$\int_n^\infty \frac{1}{x^9}\,dx = \lim_{t\to\infty}\left[\ \square\ \right]_n^t$$

$$= \lim_{t\to\infty}\left(-\frac{1}{8t^8} + \frac{1}{8n^8}\right)$$

$$= \square\ .$$

(a) Approximating the sum of the series by the tenth partial sum, we have

$$\sum_{n=1}^{\infty}\frac{1}{n^9} \approx s_{10} = \frac{1}{1^9} + \frac{1}{2^9} + \frac{1}{3^9} + \cdots + \frac{1}{10^9}$$

$\approx$ ☐ (rounded to four decimal places).

According to the remainder estimate in the Remainder Estimate for the Integral Test, we have

$$R_{10} \le \int_{10}^\infty \frac{1}{x^9}\,dx = \square$$

so the size of the error is at most 0.00000000125.

(b) Accuracy to within 0.0005 means that we have to find a value of n such that $R_n \le 0.0005$. Since

$$R_n \le \int_n^\infty \frac{1}{x^9}\,dx = \square$$

we want ☐ < 0.0005. Solving this inequality, we get

$$n^8 > \frac{1}{\square} = \square \quad \text{or} \quad n > \sqrt[8]{250}$$

We need ☐ terms to ensure accuracy to within 0.0005.

51. Question Details SCalcET8 11.4.001. [3799141]

Suppose $\sum a_n$ and $\sum b_n$ are series with positive terms and $\sum b_n$ is known to be convergent.

(a) If $a_n > b_n$ for all n, what can you say about $\sum a_n$? Why?

- $\sum a_n$ converges if and only if $a_n \le 2b_n$.
- $\sum a_n$ converges by the Comparison Test.
- $\sum a_n$ converges if and only if $a_n \le 4b_n$.
- We cannot say anything about $\sum a_n$.
- $\sum a_n$ diverges by the Comparison Test.

(b) If $a_n < b_n$ for all n, what can you say about $\sum a_n$? Why?

- $\sum a_n$ diverges by the Comparison Test.
- We cannot say anything about $\sum a_n$.
- $\sum a_n$ converges by the Comparison Test.
- $\sum a_n$ converges if and only if $\frac{b_n}{2} \le a_n \le b_n$.
- $\sum a_n$ converges if and only if $\frac{b_n}{4} \le a_n \le b_n$.

52. Question Details SCalcET8 11.4.002. [3798655]

Suppose $\sum a_n$ and $\sum b_n$ are series with positive terms and $\sum b_n$ is known to be divergent.

(a) If $a_n > b_n$ for all n, what can you say about $\sum a_n$? Why?

- $\sum a_n$ converges if and only if $2a_n \geq b_n$.
- $\sum a_n$ diverges by the Comparison Test.
- We cannot say anything about $\sum a_n$.
- $\sum a_n$ converges by the Comparison Test.
- $\sum a_n$ converges if and only if $n \cdot a_n \geq b_n$.

(b) If $a_n < b_n$ for all n, what can you say about $\sum a_n$? Why?

- $\sum a_n$ diverges by the Comparison Test.
- $\sum a_n$ converges if and only if $a_n \leq \frac{b_n}{4}$.
- $\sum a_n$ converges by the Comparison Test.
- $\sum a_n$ converges if and only if $a_n \leq \frac{b_n}{n}$.
- We cannot say anything about $\sum a_n$.

53. Question Details SCalcET8 11.4.515.XP.MI.SA. [3799198]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Determine whether the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{10n^2 - 2}{n^4 + 3}$$

54. Question Details SCalcET8 11.4.AE.001. [3798990]

Video Example

EXAMPLE 1 Determine whether the series $\sum_{n=1}^{\infty} \frac{2}{5n^2 + 4n + 3}$ converges or diverges.

SOLUTION For large n the dominant term in the denominator is $5n^2$, so we compare the given series with the series $\Sigma\ 2/(5n^2)$. Observe that

$$\frac{2}{5n^2 + 4n + 3} \ \boxed{?} \ \frac{2}{5n^2}$$

because the left side has a bigger denominator. (In the notation of the Comparison Test, a_n is the left side and b_n is the right side.) We know that

$$\sum_{n=1}^{\infty} \frac{2}{5n^2} = \square \sum_{n=1}^{\infty} \frac{1}{n^2}$$

is convergent because it's a constant times a p-series with $p =$ $\square$ > 1. Therefore

$$\sum_{n=1}^{\infty} \frac{2}{5n^2 + 4n + 3}$$

is ---Select--- by the Comparison Test.

55. Question Details SCalcET8 11.4.AE.002. [3798591]

Video Example

EXAMPLE 2 Test the series $\sum_{k=1}^{\infty} \frac{\ln(5k)}{3k}$ for convergence or divergence.

SOLUTION We used the Integral Test to test this series in this example, but we can also test it by comparing it with the harmonic series. Observe that $\ln(5k) > 1$ for $k \geq 3/5$ and so

$\frac{\ln(5k)}{3k}$ [? ▾] $\frac{1}{3k}$ $k \geq 3/5$.

We know $\Sigma\ 1/(3k)$ is divergent (p−series with $p =$ ____). Thus the given series is [---Select--- ▾] by the Comparison Test.

56. Question Details SCalcET8 11.4.005. [3798092]

Determine whether the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{n+3}{n\sqrt{n}}$$

- converges
- diverges

57. Question Details SCalcET8 11.4.007. [3798160]

Determine whether the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{5^n}{9+9^n}$$

- converges
- diverges

58. Question Details SCalcET8 11.4.009. [3798914]

Determine whether the series converges or diverges.

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

- converges
- diverges

59. Question Details SCalcET8 11.4.015. [3799014]

Determine whether the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{4^{n+1}}{3^n-4}$$

- converges
- diverges

60. Question Details SCalcET8 11.4.017. [3798223]

Determine whether the series converges or diverges.

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

- converges
- diverges

61. Question Details SCalcET8 11.4.019. [3798664]

Determine whether the series converges or diverges.

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

- converges
- diverges

62. Question Details SCalcET8 11.4.020. [3799379]

Determine whether the series converges or diverges.

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

- converges
- diverges

63. Question Details SCalcET8 11.4.028. [3799432]

Determine whether the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{e^{1/n}}{n}$$

- converges
- diverges

64. Question Details SCalcET8 11.4.029. [3799063]

Determine whether the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{32}{n!}$$

- converges
- diverges

65. Question Details SCalcET8 11.5.001. [3798352]

(a) What is an alternating series?

An alternating series is a ---Select--- whose terms are ---Select---.

(b) Under what conditions does an alternating series converge?

An alternating series $\sum_{n=1}^{\infty} a_n = \sum_{n=1}^{\infty} (-1)^{n-1} b_n$, where $b_n = |a_n|$, converges if $0 < b_{n+1} \le b_n$ for all n, and $\lim_{n \to \infty} b_n =$ [ ].

(c) If these conditions are satisfied, what can you say about the remainder after n terms?

The error involved in using the partial sum s_n as an approximation to the total sum s is the ---Select--- $R_n = s - s_n$ and the size of the error is ---Select--- b_{n+1}.

66. Question Details SCalcET8 11.5.002.MI.SA. [3798270]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Test the series for convergence or divergence.

$$\frac{6}{7} - \frac{6}{9} + \frac{6}{11} - \frac{6}{13} + \frac{6}{15} - \cdots$$

67. Question Details SCalcET8 11.5.002.MI. [3798606]

Test the series for convergence or divergence.

$$\frac{5}{6} - \frac{5}{8} + \frac{5}{10} - \frac{5}{12} + \frac{5}{14} - \cdots$$

- converges
- diverges

68. Question Details SCalcET8 11.5.003. [3798083]

Test the series for convergence or divergence.

$$-\frac{2}{5} + \frac{4}{6} - \frac{6}{7} + \frac{8}{8} - \frac{10}{9} + \cdots$$

- converges
- diverges

69. Question Details SCalcET8 11.5.005. [3799384]

Test the series for convergence or divergence.

$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{4 + 5n}$$

- converges
- diverges

70. Question Details SCalcET8 11.5.007.MI. [4126512]

Test the series for convergence or divergence.

$$\sum_{n=1}^{\infty} (-1)^n \frac{(7n - 3)}{5n + 3}$$

Evaluate the following limit. (If the quantity diverges, enter DIVERGES.)

$$\lim_{n \to \infty} (-1)^n \frac{(7n - 3)}{5n + 3}$$

Since $\lim_{n \to \infty} (-1)^n \frac{(7n - 3)}{5n + 3}$ ---Select--- , ---Select--- .

71. Question Details SCalcET8 11.5.008. [3799522]

Test the series for convergence or divergence.

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

- converges
- diverges

72. Question Details SCalcET8 11.5.009. [3799574]

Test the series for convergence or divergence.

$$\sum_{n=1}^{\infty} 8(-1)^n e^{-n}$$

- converges
- diverges

73. Question Details SCalcET8 11.5.019. [3798219]

Test the series for convergence or divergence.

$$\sum_{n=1}^{\infty} (-1)^n \frac{6n^n}{n!}$$

- converges
- diverges

74. Question Details SCalcET8 11.5.032. [3798255]

For what values of p is this series convergent?

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

- $p \geq -1$
- $p > -1$
- for all p
- $p > 0$
- $p \neq -1$

75. Question Details SCalcET8 11.5.505.XP.MI. [3798178]

Test the series for convergence or divergence.

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{n2^n}$$

Identify b_n.

Evaluate the following limit.

$$\lim_{n \to \infty} b_n$$

Since $\lim_{n \to \infty} b_n$ [?] 0 and b_{n+1} [?] b_n for all n, [---Select---].

If the series is convergent, use the Alternating Series Estimation Theorem to determine how many terms we need to add in order to find the sum with an error less than 0.0001? (If the quantity diverges, enter DIVERGES.)

[ ] terms

76. Question Details SCalcET8 11.5.505.XP.MI.SA. [3798155]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Test the series for convergence or divergence. If the series is convergent, use the Alternating Series Estimation Theorem to determine how many terms we need to add in order to find the sum with an error less than 0.0001?

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{n12^n}$$

77. Question Details SCalcET8 11.5.023. [3799357]

Test the series for convergence or divergence.

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

- converges
- diverges

If the series is convergent, use the Alternating Series Estimation Theorem to determine how many terms we need to add in order to find the sum with an error less than 0.00005. (If the quantity diverges, enter DIVERGES.)

[ ] terms

78. Question Details SCalcET8 11.6.001. [3799325]

What can you say about the series $\sum a_n$ in each of the following cases?

(a) $\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right| = 8$

- absolutely convergent
- conditionally convergent
- divergent
- cannot be determined

(b) $\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right| = 0.3$

- absolutely convergent
- conditionally convergent
- divergent
- cannot be determined

(c) $\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right| = 1$

- absolutely convergent
- conditionally convergent
- divergent
- cannot be determined

79. Question Details SCalcET8 11.6.002. [3798282]

Determine whether the series is absolutely convergent, conditionally convergent, or divergent.

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

- absolutely convergent
- conditionally convergent
- divergent

80. Question Details SCalcET8 11.6.004. [3798423]

Determine whether the series is absolutely convergent, conditionally convergent, or divergent.

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

- absolutely convergent
- conditionally convergent
- divergent

81. Question Details SCalcET8 11.6.005. [3798673]

Determine whether the series is absolutely convergent, conditionally convergent, or divergent.

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

- absolutely convergent
- conditionally convergent
- divergent

82. Question Details SCalcET8 11.6.007. [3798531]

Use the Ratio Test to determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{n}{5^n}$$

Identify a_n.

Evaluate the following limit.

$$\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right|$$

Since $\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right|$? ▾ 1, ---Select--- ▾.

83. Question Details SCalcET8 11.6.009. [3799066]

Use the Ratio Test to determine whether the series is convergent or divergent.

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

Identify a_n.

Evaluate the following limit.

$$\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right|$$

Since $\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right|$? ▾ 1, ---Select--- ▾.

84. Question Details SCalcET8 11.6.014.MI.SA. [3799386]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Use the Ratio Test to determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{n!}{89^n}$$

85. Question Details SCalcET8 11.6.025. [3798118]

Use the Root Test to determine whether the series convergent or divergent.

$$\sum_{n=1}^{\infty} \left(\frac{n^2 + 8}{7n^2 + 6} \right)^n$$

Identify a_n.

Evaluate the following limit.

$$\lim_{n \to \infty} \sqrt[n]{|a_n|}$$

Since $\lim_{n \to \infty} \sqrt[n]{|a_n|}$ [?] 1, [---Select---].

86. Question Details SCalcET8 11.6.AE.006. [3798286]

Video Example

EXAMPLE 6 Test the convergence of the series $\sum_{n=1}^{\infty} \left(\frac{3n + 1}{4n + 4} \right)^n$.

SOLUTION

$$a_n = \left(\frac{3n + 1}{4n + 4} \right)^n$$

$$\sqrt[n]{|a_n|} =$$

$$= \frac{3 + \frac{1}{n}}{4 + \frac{4}{n}} \to \quad < 1$$

Thus the given series [---Select---] by the Root Test.

87. Question Details SCalcET8 11.7.AE.001. [3798328]

Video Example

EXAMPLE 1 Indicate which test should be used to determine whether the series below converges or diverges.

$$\sum_{n=1}^{\infty} \frac{n - 4}{5n + 4}$$

SOLUTION Since $a_n \to$ [ ] $\neq 0$ as $n \to \infty$, we should use the [---Select---].

88. Question Details SCalcET8 11.7.AE.002. [3799340]

Video Example

EXAMPLE 2 Indicate which test should be used to determine whether the series below converges or diverges.

$$\sum_{n=1}^{\infty} \frac{\sqrt{n^3 + 5}}{7n^3 + 2n^2 + 4}$$

SOLUTION Since a_n is an algebraic function of n, we compare the given series with a p-series. The comparison series for the [---Select---] is $\Sigma\, b_n$, where

$$b_n = \frac{\sqrt{n^3}}{7n^3} = \frac{n^{3/2}}{7n^3} = \frac{1}{\quad}.$$

89. Question Details SCalcET8 11.7.AE.003. [3798112]

Video Example

EXAMPLE 3 Indicate which test should be used to determine whether the series below converges or diverges.

$$\sum_{n=1}^{\infty} n^3 e^{-4n^4}$$

SOLUTION Since the integral below is easily evaluated, we use the ---Select---. The Ratio Test also works.

$$\int_1^{\infty} x^3 e^{-4x^4}\,dx$$

90. Question Details SCalcET8 11.7.AE.004. [3798472]

EXAMPLE 4 Indicate which test should be used to determine whether the series below converges or diverges.

$$\sum_{n=1}^{\infty} (-1)^n \frac{n^4}{n^5+1}$$

SOLUTION Since the the series is alternating, we use the ---Select---.

91. Question Details SCalcET8 11.7.AE.005. [3798396]

Video Example

EXAMPLE 5 Indicate which test should be used to determine whether the series below converges or diverges.

$$\sum_{k=1}^{\infty} \frac{4^k}{k!}$$

SOLUTION Since the the series involves $k!$, we use the ---Select---.

92. Question Details SCalcET8 11.7.AE.006. [3799457]

EXAMPLE 6 Indicate which test should be used to determine whether the series below converges or diverges.

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

SOLUTION Since the the series is closely related to the geometric series $\Sigma\ 1/2^n$, we use the ---Select---.

93. Question Details SCalcET8 11.7.001. [3799367]

Test the series for convergence or divergence.

$$\sum_{n=1}^{\infty} \frac{n^4-1}{n^5+1}$$

- convergent
- divergent

94. Question Details SCalcET8 11.7.003. [3798899]

Test the series for convergence or divergence.

$$\sum_{n=1}^{\infty} (-1)^n \frac{n^8-1}{n^9+1}$$

- convergent
- divergent

95. Question Details SCalcET8 11.7.005. [3799228]

Test the series for convergence or divergence.

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

- convergent
- divergent

96. Question Details SCalcET8 11.7.010. [3798125]

Test the series for convergence or divergence.

$$\sum_{n=1}^{\infty} n^7 e^{-n^8}$$

- convergent
- divergent

97. Question Details SCalcET8 11.7.011. [3798263]

Test the series for convergence or divergence.

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

- convergent
- divergent

98. Question Details SCalcET8 11.7.013. [3798736]

Test the series for convergence or divergence.

$$\sum_{n=1}^{\infty} \frac{9^n n^3}{n!}$$

- convergent
- divergent

99. Question Details SCalcET8 11.7.014. [3798416]

Test the series for convergence or divergence.

$$\sum_{n=1}^{\infty} \frac{\sin(3n)}{1 + 8^n}$$

- convergent
- divergent

100. Question Details SCalcET8 11.7.026. [3798381]

Test the series for convergence or divergence.

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

- convergent
- divergent

101. Question Details SCalcET8 11.7.031. [3798193]

Test the series for convergence or divergence.

$$\sum_{k=1}^{\infty} \frac{4^k}{2^k + 3^k}$$

- convergent
- divergent

102. Question Details SCalcET8 11.7.032. [3798657]

Test the series for convergence or divergence.

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

- convergent
- divergent

Assignment Details

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