1. The series $\sum_{n=1}^{\infty} \frac{(4n!)^4}{(4n+12)!}$ is

(a) a series for which the ratio test is inconclusive
(b) conditionally convergent
(c) divergent by the ratio test
(d) absolutely convergent
(e) a divergent p series

---

2. The series $\sum_{n=1}^{\infty} \frac{5^{n-1}n^n}{3^{3n+4}}$ is

(a) diverges by the root test
(b) a convergent p series
(c) converges by the root test
(d) a series for which the root test is inconclusive
(e) a divergent geometric series

---

3. The series $\sum_{n=1}^{\infty}(-1)^n(\sqrt{n+4}-\sqrt{n+3})$ is

(a) conditionally convergent
(b) diverges by the limit comparison test
(c) absolutely convergent
(d) diverges by the divergent test
(e) divergent by the ratio test

---

4. The series $\sum_{n=1}^{\infty} \frac{1}{(\sqrt{2n+3}-3)\sqrt{2n+3}}$ is

(a) diverges by the limit comparison test
(b) convergent by the integral test
(c) convergent by the ratio test
(d) convergent by the root test
(e) divergent by the ratio test

5. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\pi^n + n^\pi}$ is

(a) absolutely convergent
(b) conditionally convergent
(c) divergent
(d) convergent by the integral test
(e) divergent by the alternating series test

---

6. The series $\sum_{n=1}^{\infty}(7\sqrt{5}-\sqrt[n]{\pi})^{n/2}$ is

(a) divergent by the root test
(b) convergent by the root test
(c) a divergent geometric series
(d) conditionally convergent
(e) the root test is inconclusive

---

7. How many terms of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{(n+2)^2}$ do we need to add so that $\mid error \mid < 0.01$

(a) 8
(b) 6
(c) 4
(d) 2
(e) 5

---

8. By applying the ratio test to the series $\sum_{n=1}^{\infty} \frac{\sqrt{1+2n}}{3+(1-n)^2}$ we conclude that

(a) the test is inconclusive
(b) conditionally convergent
(c) divergent
(d) absolutely convergent
(e) convergent

9. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}n^2}{n^3+1}$ is

(a) conditionally convergent
(b) absolutely convergent
(c) divergent
(d) convergent by the integral test
(e) divergent by the alternating series test

---

10. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}(n!)^2 2^n}{(n+2)!}$ is

(a) divergent
(b) conditionally convergent
(c) absolutely convergent
(d) convergent by the integral test
(e) divergent by the alternating series test

---

11. The series $\sum_{n=1}^{\infty} \frac{2n^2+3n\ln n}{5+7\ln n}$ is

(a) divergent
(b) conditionally convergent
(c) absolutely convergent
(d) convergent by the integral test
(e) divergent by the alternating series test

---

12. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n^2-1}\sin n}{(n+1)^2}$ is

(a) absolutely convergent
(b) conditionally convergent
(c) divergent
(d) divvergent by the root test
(e) divergent by the alternating series test

13. Which of the following series is divergent? (I) $\sum_{n=1}^{\infty} \frac{\cos^4 n}{n^2+\cosh n}$ (II) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ (III) $\sum_{n=1}^{\infty} \frac{(-\pi)^n}{4^n}$ (IV) $\sum_{n=1}^{\infty} \frac{1}{n^{(e-2)/3}}$

(a) (IV)
(b) (II) and (IV)
(c) (I) and (II)
(d) (I) and (III)
(e) none of the above

---

14. The series $\sum_{n=1}^{\infty} \frac{n!}{(5)(9)(13)\cdots(4n+1)}$

(a) convergent by the Ratio Test
(b) divergent by the Ratio Test
(c) a series for which the Ratio Test is inconclusive
(d) conditionally convergent
(e) none of the above

---

15. Using the Integral Test Remainder Estimate for the series $\sum_{n=1}^{\infty} \frac{1}{n^5}$,we find that the smallest number of terms needed to ensure that the sum is accurate to within 0.0004 is equal to

(a) 6
(b) 2
(c) 10
(d) 12
(e) none of the above

---

1. The series $\sum_{n=1}^{\infty} \frac{2n^2+3n\ln n}{5+7\ln n}$ is
   (a) absolutely convergent
   (b) divergent by the alternating series test
   (c) divergent
   (d) conditionally convergent
   (e) convergent by the integral test

---

2. The series $\sum_{n=1}^{\infty} \frac{n!}{(5)(9)(13)\cdots(4n+1)}$
   (a) a series for which the Ratio Test is inconclusive
   (b) conditionally convergent
   (c) convergent by the Ratio Test
   (d) divergent by the Ratio Test
   (e) none of the above

---

3. Using the Integral Test Remainder Estimate for the series $\sum_{n=1}^{\infty} \frac{1}{n^5}$,we find that the smallest number of terms needed to ensure that the sum is accurate to within 0.0004 is equal to
   (a) 12
   (b) 2
   (c) 6
   (d) 10
   (e) none of the above

---

4. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n^2-1}\sin n}{(n+1)^2}$ is
   (a) divergent
   (b) conditionally convergent
   (c) divvergent by the root test
   (d) absolutely convergent
   (e) divergent by the alternating series test

5. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}n^2}{n^3+1}$ is
   (a) divergent
   (b) divergent by the alternating series test
   (c) convergent by the integral test
   (d) conditionally convergent
   (e) absolutely convergent

---

6. How many terms of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{(n+2)^2}$ do we need to add so that $\mid error \mid < 0.01$
   (a) 8
   (b) 2
   (c) 5
   (d) 4
   (e) 6

---

7. The series $\sum_{n=1}^{\infty}(7\sqrt{5} - \sqrt[n]{\pi})^{n/2}$ is
   (a) conditionally convergent
   (b) the root test is inconclusive
   (c) divergent by the root test
   (d) a divergent geometric series
   (e) convergent by the root test

---

8. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\pi^n + n^\pi}$ is
   (a) divergent by the alternating series test
   (b) divergent
   (c) convergent by the integral test
   (d) conditionally convergent
   (e) absolutely convergent

9. By applying the ratio test to the series $\sum_{n=1}^{\infty} \frac{\sqrt{1+2n}}{3+(1-n)^2}$ we conclude that

(a) conditionally convergent
(b) absolutely convergent
(c) convergent
(d) divergent
(e) the test is inconclusive

---

10. The series $\sum_{n=1}^{\infty} \frac{5^{n-1}n^n}{3^{3n+4}}$ is

(a) a convergent p series
(b) diverges by the root test
(c) a divergent geometric series
(d) converges by the root test
(e) a series for which the root test is inconclusive

---

11. The series $\sum_{n=1}^{\infty} \frac{1}{(\sqrt{2n+3}-3)\sqrt{2n+3}}$ is

(a) divergent by the ratio test
(b) convergent by the integral test
(c) diverges by the limit comparison test
(d) convergent by the root test
(e) convergent by the ratio test

---

12. Which of the following series is divergent? (I) $\sum_{n=1}^{\infty} \frac{\cos^4 n}{n^2+\cosh n}$ (II) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ (III) $\sum_{n=1}^{\infty} \frac{(-\pi)^n}{4^n}$ (IV) $\sum_{n=1}^{\infty} \frac{1}{n^{(e-2)/3}}$

(a) (I) and (II)
(b) (IV)
(c) (I) and (III)
(d) (II) and (IV)
(e) none of the above

13. The series $\sum_{n=1}^{\infty}(-1)^n(\sqrt{n+4}-\sqrt{n+3})$ is

(a) diverges by the divergent test
(b) absolutely convergent
(c) diverges by the limit comparison test
(d) conditionally convergent
(e) divergent by the ratio test

---

14. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}(n!)^2 2^n}{(n+2)!}$ is

(a) conditionally convergent
(b) divergent
(c) convergent by the integral test
(d) absolutely convergent
(e) divergent by the alternating series test

---

15. The series $\sum_{n=1}^{\infty} \frac{(4n!)^4}{(4n+12)!}$ is

(a) divergent by the ratio test
(b) conditionally convergent
(c) absolutely convergent
(d) a series for which the ratio test is inconclusive
(e) a divergent p series

---

1. The series $\sum_{n=1}^{\infty} \frac{n!}{(5)(9)(13)\cdots(4n+1)}$

(a) a series for which the Ratio Test is inconclusive
(b) divergent by the Ratio Test
(c) convergent by the Ratio Test
(d) conditionally convergent
(e) none of the above

---

2. Which of the following series is divergent? (I) $\sum_{n=1}^{\infty} \frac{\cos^4 n}{n^2+\cosh n}$ (II) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ (III) $\sum_{n=1}^{\infty} \frac{(-\pi)^n}{4^n}$ (IV) $\sum_{n=1}^{\infty} \frac{1}{n^{(e-2)/3}}$

(a) (IV)
(b) (I) and (III)
(c) (II) and (IV)
(d) (I) and (II)
(e) none of the above

---

3. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n^2-1}\sin n}{(n+1)^2}$ is

(a) conditionally convergent
(b) divvergent by the root test
(c) absolutely convergent
(d) divergent
(e) divergent by the alternating series test

---

4. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\pi^n + n^\pi}$ is

(a) divergent by the alternating series test
(b) convergent by the integral test
(c) conditionally convergent
(d) divergent
(e) absolutely convergent

5. The series $\sum_{n=1}^{\infty} \frac{(4n!)^4}{(4n+12)!}$ is

(a) a series for which the ratio test is inconclusive
(b) absolutely convergent
(c) divergent by the ratio test
(d) conditionally convergent
(e) a divergent p series

---

6. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}n^2}{n^3+1}$ is

(a) absolutely convergent
(b) divergent
(c) divergent by the alternating series test
(d) convergent by the integral test
(e) conditionally convergent

---

7. The series $\sum_{n=1}^{\infty} \frac{5^{n-1}n^n}{3^{3n+4}}$ is

(a) diverges by the root test
(b) a convergent p series
(c) a divergent geometric series
(d) converges by the root test
(e) a series for which the root test is inconclusive

---

8. How many terms of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{(n+2)^2}$ do we need to add so that $|\ error\ | < 0.01$

(a) 8
(b) 5
(c) 2
(d) 4
(e) 6

9. The series $\sum_{n=1}^{\infty}(7\sqrt{5}-\sqrt[n]{\pi})^{n/2}$ is

(a) the root test is inconclusive
(b) convergent by the root test
(c) a divergent geometric series
(d) divergent by the root test
(e) conditionally convergent

---

10. The series $\sum_{n=1}^{\infty}\frac{2n^2+3n\ln n}{5+7\ln n}$ is

(a) divergent
(b) conditionally convergent
(c) divergent by the alternating series test
(d) convergent by the integral test
(e) absolutely convergent

---

11. Using the Integral Test Remainder Estimate for the series $\sum_{n=1}^{\infty}\frac{1}{n^5}$,we find that the smallest number of terms needed to ensure that the sum is accurate to within 0.0004 is equal to

(a) 2
(b) 10
(c) 6
(d) 12
(e) none of the above

---

12. The series $\sum_{n=1}^{\infty}(-1)^n(\sqrt{n+4}-\sqrt{n+3})$ is

(a) conditionally convergent
(b) divergent by the ratio test
(c) diverges by the limit comparison test
(d) absolutely convergent
(e) diverges by the divergent test

13. By applying the ratio test to the series $\sum_{n=1}^{\infty}\frac{\sqrt{1+2n}}{3+(1-n)^2}$ we conclude that

(a) divergent
(b) absolutely convergent
(c) conditionally convergent
(d) convergent
(e) the test is inconclusive

---

14. The series $\sum_{n=1}^{\infty}\frac{(-1)^{n+1}(n!)^2 2^n}{(n+2)!}$ is

(a) divergent by the alternating series test
(b) convergent by the integral test
(c) conditionally convergent
(d) absolutely convergent
(e) divergent

---

15. The series $\sum_{n=1}^{\infty}\frac{1}{(\sqrt{2n+3}-3)\sqrt{2n+3}}$ is

(a) divergent by the ratio test
(b) convergent by the integral test
(c) convergent by the ratio test
(d) diverges by the limit comparison test
(e) convergent by the root test

---

1. Which of the following series is divergent? (I) $\sum_{n=1}^{\infty} \frac{\cos^4 n}{n^2+\cosh n}$ (II) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ (III) $\sum_{n=1}^{\infty} \frac{(-\pi)^n}{4^n}$ (IV) $\sum_{n=1}^{\infty} \frac{1}{n^{(e-2)/3}}$

   (a) (I) and (III)
   (b) (I) and (II)
   (c) (II) and (IV)
   (d) (IV)
   (e) none of the above

---

2. The series $\sum_{n=1}^{\infty} \frac{5^{n-1}n^n}{3^{3n+4}}$ is

   (a) a series for which the root test is inconclusive
   (b) a convergent p series
   (c) a divergent geometric series
   (d) diverges by the root test
   (e) converges by the root test

---

3. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n^2-1}\sin n}{(n+1)^2}$ is

   (a) conditionally convergent
   (b) divvergent by the root test
   (c) absolutely convergent
   (d) divergent
   (e) divergent by the alternating series test

---

4. The series $\sum_{n=1}^{\infty} \frac{n!}{(5)(9)(13)\cdots(4n+1)}$

   (a) conditionally convergent
   (b) a series for which the Ratio Test is inconclusive
   (c) divergent by the Ratio Test
   (d) convergent by the Ratio Test
   (e) none of the above

5. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\pi^n + n^\pi}$ is

   (a) divergent
   (b) convergent by the integral test
   (c) absolutely convergent
   (d) conditionally convergent
   (e) divergent by the alternating series test

---

6. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}(n!)^2 2^n}{(n+2)!}$ is

   (a) divergent
   (b) absolutely convergent
   (c) conditionally convergent
   (d) convergent by the integral test
   (e) divergent by the alternating series test

---

7. The series $\sum_{n=1}^{\infty}(-1)^n(\sqrt{n+4}-\sqrt{n+3})$ is

   (a) diverges by the limit comparison test
   (b) diverges by the divergent test
   (c) divergent by the ratio test
   (d) conditionally convergent
   (e) absolutely convergent

---

8. The series $\sum_{n=1}^{\infty}(7\sqrt{5} - \sqrt[n]{\pi})^{n/2}$ is

   (a) divergent by the root test
   (b) the root test is inconclusive
   (c) convergent by the root test
   (d) a divergent geometric series
   (e) conditionally convergent

9. The series $\sum_{n=1}^{\infty} \frac{(4n!)^4}{(4n+12)!}$ is

(a) a series for which the ratio test is inconclusive

(b) divergent by the ratio test

(c) absolutely convergent

(d) conditionally convergent

(e) a divergent p series

---

10. How many terms of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{(n+2)^2}$ do we need to add so that $|\, error \,| < 0.01$

(a) 2

(b) 5

(c) 4

(d) 6

(e) 8

---

11. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}n^2}{n^3+1}$ is

(a) conditionally convergent

(b) divergent by the alternating series test

(c) divergent

(d) convergent by the integral test

(e) absolutely convergent

---

12. The series $\sum_{n=1}^{\infty} \frac{2n^2+3n\ln n}{5+7\ln n}$ is

(a) convergent by the integral test

(b) absolutely convergent

(c) divergent

(d) divergent by the alternating series test

(e) conditionally convergent

---

13. The series $\sum_{n=1}^{\infty} \frac{1}{(\sqrt{2n+3}-3)\sqrt{2n+3}}$ is

(a) diverges by the limit comparison test

(b) convergent by the root test

(c) divergent by the ratio test

(d) convergent by the integral test

(e) convergent by the ratio test

---

14. By applying the ratio test to the series $\sum_{n=1}^{\infty} \frac{\sqrt{1+2n}}{3+(1-n)^2}$ we conclude that

(a) conditionally convergent

(b) divergent

(c) the test is inconclusive

(d) absolutely convergent

(e) convergent

---

15. Using the Integral Test Remainder Estimate for the series $\sum_{n=1}^{\infty} \frac{1}{n^5}$,we find that the smallest number of terms needed to ensure that the sum is accurate to within 0.0004 is equal to

(a) 6

(b) 10

(c) 12

(d) 2

(e) none of the above

---

1. Which of the following series is divergent? (I) $\sum_{n=1}^{\infty} \frac{\cos^4 n}{n^2+\cosh n}$ (II) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ (III) $\sum_{n=1}^{\infty} \frac{(-\pi)^n}{4^n}$ (IV) $\sum_{n=1}^{\infty} \frac{1}{n^{(e-2)/3}}$

   (a) (IV)
   (b) (I) and (III)
   (c) (II) and (IV)
   (d) (I) and (II)
   (e) none of the above

---

2. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1} n^2}{n^3+1}$ is

   (a) divergent
   (b) conditionally convergent
   (c) divergent by the alternating series test
   (d) convergent by the integral test
   (e) absolutely convergent

---

3. The series $\sum_{n=1}^{\infty} (7\sqrt{5} - \sqrt[n]{\pi})^{n/2}$ is

   (a) the root test is inconclusive
   (b) a divergent geometric series
   (c) conditionally convergent
   (d) convergent by the root test
   (e) divergent by the root test

---

4. The series $\sum_{n=1}^{\infty} \frac{5^{n-1} n^n}{3^{3n+4}}$ is

   (a) a series for which the root test is inconclusive
   (b) a convergent p series
   (c) a divergent geometric series
   (d) converges by the root test
   (e) diverges by the root test

5. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\pi^n + n^\pi}$ is

   (a) divergent by the alternating series test
   (b) convergent by the integral test
   (c) divergent
   (d) absolutely convergent
   (e) conditionally convergent

---

6. The series $\sum_{n=1}^{\infty} \frac{1}{(\sqrt{2n+3}-3)\sqrt{2n+3}}$ is

   (a) convergent by the integral test
   (b) convergent by the ratio test
   (c) diverges by the limit comparison test
   (d) convergent by the root test
   (e) divergent by the ratio test

---

7. The series $\sum_{n=1}^{\infty} \frac{n!}{(5)(9)(13)\cdots(4n+1)}$

   (a) conditionally convergent
   (b) divergent by the Ratio Test
   (c) a series for which the Ratio Test is inconclusive
   (d) convergent by the Ratio Test
   (e) none of the above

---

8. Using the Integral Test Remainder Estimate for the series $\sum_{n=1}^{\infty} \frac{1}{n^5}$,we find that the smallest number of terms needed to ensure that the sum is accurate to within 0.0004 is equal to

   (a) 12
   (b) 2
   (c) 6
   (d) 10
   (e) none of the above

9. By applying the ratio test to the series $\sum_{n=1}^{\infty} \frac{\sqrt{1+2n}}{3+(1-n)^2}$ we conclude that

(a) convergent
(b) the test is inconclusive
(c) absolutely convergent
(d) conditionally convergent
(e) divergent

---

10. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n^2-1}\sin n}{(n+1)^2}$ is

(a) absolutely convergent
(b) divergent
(c) conditionally convergent
(d) divergent by the alternating series test
(e) divvergent by the root test

---

11. The series $\sum_{n=1}^{\infty} \frac{(4n!)^4}{(4n+12)!}$ is

(a) a series for which the ratio test is inconclusive
(b) divergent by the ratio test
(c) absolutely convergent
(d) conditionally convergent
(e) a divergent p series

---

12. The series $\sum_{n=1}^{\infty} \frac{2n^2+3n\ln n}{5+7\ln n}$ is

(a) divergent by the alternating series test
(b) convergent by the integral test
(c) absolutely convergent
(d) divergent
(e) conditionally convergent

13. How many terms of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{(n+2)^2}$ do we need to add so that $|\ error\ | < 0.01$

(a) 8
(b) 5
(c) 6
(d) 2
(e) 4

---

14. The series $\sum_{n=1}^{\infty}(-1)^n(\sqrt{n+4}-\sqrt{n+3})$ is

(a) diverges by the limit comparison test
(b) divergent by the ratio test
(c) absolutely convergent
(d) diverges by the divergent test
(e) conditionally convergent

---

15. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}(n!)^2 2^n}{(n+2)!}$ is

(a) conditionally convergent
(b) divergent by the alternating series test
(c) divergent
(d) absolutely convergent
(e) convergent by the integral test

Q	MASTER	CODE01	CODE02	CODE03	CODE04
1	A	C	C	D	A
2	A	C	A	D	B
3	A	C	C	C	E
4	A	D	E	D	E
5	A	D	A	C	D
6	A	A	E	A	C
7	A	C	A	D	D
8	A	E	A	A	C
9	A	E	D	A	B
10	A	B	A	E	A
11	A	C	C	A	A
12	A	B	A	C	D
13	A	D	E	A	A
14	A	B	E	C	E
15	A	D	D	A	C

Answer Counts

V	A	B	C	D	E
1	1	3	5	4	2
2	6	0	3	2	4
3	6	0	4	4	1
4	4	2	3	3	3