

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

A.)  $\lim_{n \rightarrow \infty} \left| \frac{a_{n+1}}{a_n} \right| = 8$

B.)  $\lim_{n \rightarrow \infty} \left| \frac{a_{n+1}}{a_n} \right| = 0.8$

C.)  $\lim_{n \rightarrow \infty} \left| \frac{a_{n+1}}{a_n} \right| = 1$

Determine whether the series is convergent or divergent.

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

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

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

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

6.  $\sum_{n=0}^{\infty} \frac{(-3)^n}{(2n+1)!}$

7.  $\sum_{k=1}^{\infty} k \left( \frac{2}{3} \right)^k$

8.  $\sum_{n=1}^{\infty} \frac{n!}{100^n}$

9.  $\sum_{n=1}^{\infty} (-1)^n \frac{(1.1)^n}{n^4}$

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

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

12.  $\sum_{n=1}^{\infty} \frac{\sin 4n}{4^n}$

13.  $\sum_{n=1}^{\infty} \frac{10^n}{(n+1)4^{2n+1}}$

14.  $\sum_{n=1}^{\infty} \frac{n^{10}}{(-10)^{n+1}}$

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

**Review**

R1. Given the equation  $y = 3\sin^2\left(\frac{x}{2}\right)$ , what

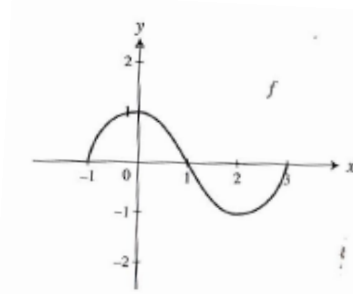
is an equation of the tangent line to the graph at  $x = \pi$  ?

- a.  $y = 3$
- b.  $y = \pi$
- c.  $y = \pi + 3$
- d.  $y = x - \pi + 3$
- e.  $y = 3(x - \pi) + 3$

R3. The graph of  $f$  consists of two semicircles, for  $-1 \leq x \leq 3$  as shown in the

figure below. What is the value of  $\int_{-1}^3 f(x) dx$  ?

- a. 0
- b.  $\pi$
- c.  $2\pi$
- d.  $4\pi$
- e.  $8\pi$



R2. The position function of a moving particle on the x-axis is given as

$s(t) = t^3 + t^2 - 8t$  for  $0 \leq t \leq 10$ . For what values of  $t$  is the particle moving right?

- a.  $t < -2$
- b.  $t > 0$
- c.  $t < \frac{4}{3}$
- d.  $0 < t < \frac{4}{3}$
- e.  $t > \frac{4}{3}$

R4. If  $f(x) = \int_1^x t(t^3 + 1)^{\frac{3}{2}} dt$ , then  $f'(2)$  is

- a.  $2^{\frac{3}{2}}$
- b.  $54 - 2^{\frac{3}{2}}$
- c. 54
- d.  $135 - \frac{13\sqrt{2}}{2}$
- e. 135

**Answers:**

- 1.) A. diverges by ratio B. converges by ratio C. inclusive
- 2.) Divergent by ratio
- 3.) Absolutely convergent by ratio
- 4.) Converges by alternating
- 5.) Converges by alternating
- 6.) Absolutely convergent by ratio
- 7.) Absolutely convergent by ratio
- 8.) Diverges by ratio
- 9.) Diverges by ratio
- 10.) Converges by alternating
- 11.) Converges by alternating
- 12.) Converges by Comparison
- 13.) Converges Absolutely by Ratio
- 14.) Converges Absolutely by Ratio
- 15.) Converges Absolutely by Root
- R1.) A R2.) E R3.) A R4.) C