

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

1. $a_n = \frac{3+5n^2}{n+n^2}$

2. $a_n = \frac{3^{n+2}}{5^n}$

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

4. $a_n = \cos\left(\frac{2}{n}\right)$

5. $a_n = \frac{\cos^2 n}{2^n}$

6. $a_n = \sqrt{\frac{n+1}{9n+1}}$

Determine if the sequence is increasing, decreasing, or not monotonic. Is the sequence bounded?

7. $a_n = \frac{1}{2n+3}$

8. $a_n = \frac{2n-3}{3n+4}$

Review:

R1. $\lim_{x \rightarrow -\infty} \frac{2x-1}{1+2x}$

- A. -1
- B. 0
- C. 1
- D. 2
- E. nonexistant

R3. The radius of a sphere is increasing at a constant rate of 2 cm/sec. At the instant when the volume of the sphere is increasing at $32\pi \text{ cm}^3 / \text{sec}$, the surface area of the

sphere is: $V_{\text{sphere}} = \frac{4}{3}\pi r^3$ $SA_{\text{sphere}} = 4\pi r^2$

- A. 8π
- B. $\frac{32\pi}{3}$
- C. 16π
- D. 64π
- E. $\frac{256\pi}{3}$

R5. What is the $\lim_{x \rightarrow \ln 2} g(x)$, if

$$g(x) = \begin{cases} e^x & \text{if } x > \ln 2 \\ 4 - e^x & \text{if } x \leq \ln 2 \end{cases}$$

- A. -2
- B. $\ln 2$
- C. e^2
- D. 2
- E. nonexistant

Answers:

1. Converges to 5
2. Converges to 0
3. Diverges
4. Converges to 1
5. Converges to 0
6. Converges to 1/3
7. Decreasing and bounded $[0, 1/5]$
8. Increasing and bounded $[-1/7, 2/3]$

R1.C R2.C R3.C R4.E R5.D R6.A

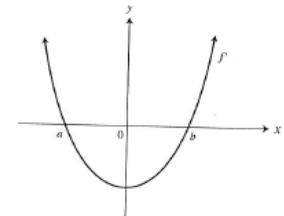
R2. $\int_{\pi/2}^x \cos t \, dt$

- A. $\cos x$
- B. $-\sin x$
- C. $\sin x - 1$
- D. $\sin x + 1$
- E. $-\sin x + 1$

R4. $A = \frac{\sqrt{3}}{4}(5s-1)^2$, what is the instantaneous rate of change of A with respect to s at $s=1$?

- A. $2\sqrt{8}$
- B. $2\sqrt{3}$
- C. $\frac{5}{2}\sqrt{3}$
- D. $4\sqrt{3}$
- E. $10\sqrt{3}$

R6. The graph of f' is shown. A possible graph of f is:



- A. (A)
- B. (B)
- C. (C)
- D. (D)
- E. (E)