This print-out should have 11 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001 10.0 points

Determine whether the sequence $\{a_n\}$ converges or diverges when

$$a_n = \frac{n-4}{4n+1},$$

and if it converges, find the limit.

1. converges with limit $= 0$

2. converges with limit $= -4$

3. converges with limit $= \frac{1}{4}$

4. diverges

5. converges with limit $= -\frac{3}{5}$

002 10.0 points

Determine if the sequence $\{a_n\}$ converges, when

$$a_n = \frac{7\,n^4 - 2\,n^3 + 4}{2\,n^4 + 3\,n^2 + 3},$$

and if it does, find its limit.

1. limit $= -\frac{2}{3}$

2. the sequence diverges

3. limit $= 0$

4. limit $= \frac{4}{3}$

5. limit $= \frac{7}{2}$

003 10.0 points

Determine whether the sequence $\{a_n\}$ converges or diverges when

$$a_n = n(n-3),$$

and if it converges, find the limit.

1. diverges

2. converges with limit $= 0$

3. converges with limit $= 1$

4. converges with limit $= 9$

5. converges with limit $= 3$

004 10.0 points

Find a formula for the general term a_n of the sequence

$$\{a_n\}_{n=1}^{\infty} = \Big\{\, 1,\ 5,\ 9,\ 13,\ \dots \,\Big\},$$

assuming that the pattern of the first few terms continues.

1. $a_n = n + 4$

2. $a_n = 5n - 4$

3. $a_n = n + 3$

4. $a_n = 3n - 2$

5. $a_n = 4n - 3$

005 10.0 points

Determine whether the sequence $\{a_n\}$ converges or diverges when

$$a_n = n^2 e^{-5n},$$

and if it converges, find the limit.

1. converges with limit $= 5$

2. sequence diverges

3. converges with limit $= \dfrac{2}{25}$

4. converges with limit $= -5$

5. converges with limit $= 0$

---

006 10.0 points

Find a formula for the general term a_n of the sequence

$$\{a_n\}_{n=1}^{\infty} = \left\{ 1, -\frac{2}{5}, \frac{4}{25}, -\frac{8}{125}, \cdots \right\},$$

assuming that the pattern of the first few terms continues.

1. $a_n = -\left(\dfrac{1}{2}\right)^n$

2. $a_n = \left(-\dfrac{5}{2}\right)^{n-1}$

3. $a_n = -\left(\dfrac{2}{5}\right)^n$

4. $a_n = \left(-\dfrac{2}{5}\right)^{n-1}$

5. $a_n = -\left(\dfrac{5}{2}\right)^n$

6. $a_n = \left(-\dfrac{1}{2}\right)^{n-1}$

---

007 10.0 points

Determine if the sequence $\{a_n\}$ converges when

$$a_n = \frac{(2n+1)!}{(2n-1)!},$$

and if it converges, find the limit.

1. converges with limit $= 4$

2. converges with limit $= \dfrac{1}{4}$

3. converges with limit $= 1$

4. does not converge

5. converges with limit $= 0$

---

008 10.0 points

Which of the following sequences converge?

A. $\left\{\dfrac{e^n+5}{3n+4}\right\}$

B. $\left\{\dfrac{5e^n}{2+e^n}\right\}$

1. A only

2. neither of them

3. B only

4. both A and B

---

009 10.0 points

Determine the least upper bound (LUB) and the greatest lower bound (GLB) for the sequence:

$$\left\{\frac{1}{2n}\right\}_{n=1}^{\infty}$$

.

1. LUB $= 0$, GLB $= 1$

2. LUB $= 1$, GLB $= \dfrac{1}{2}$

3. LUB $= 1$, GLB $= 0$

4. LUB $= \dfrac{1}{2}$, GLB $= 0$

5. LUB $= 0$, GLB $= \dfrac{1}{2}$

---

010 10.0 points

Determine the least upper bound (LUB) and the greatest lower bound (GLB) for the sequence:

$$\left\{\frac{3n+1}{2n}\right\}_{n=1}^{\infty}$$

1. LUB $= 1$, GLB $= 0$

2. LUB $= 2$, GLB $= \dfrac{3}{2}$

3. LUB $= 0$, GLB $= \dfrac{3}{2}$

4. LUB $= \dfrac{3}{2}$, GLB $= 0$

5. LUB $= \dfrac{3}{2}$, GLB $= 2$

---

011 10.0 points

Determine the least upper bound (LUB) and the greatest lower bound (GLB) for the sequence:

$$\left\{ \frac{n^2+1}{n} \right\}_{n=1}^{\infty}$$

1. LUB $= 0$, GLB $= 1$

2. LUB = none, GLB $= 2$

3. LUB $= 2$, GLB = none

4. LUB $= 1$, GLB $= 0$