

Math 122
Quiz 7 Review

Determine if the following sequences converge or diverge, If it converges, find the limit:

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|-------------------------------------------------------------|---------------------------------------------------------------------|
| 1. $\left\{ \frac{2n-1}{3n^2+1} \right\}_{n=1}^{\infty}$ | 3. $\left\{ \left(\frac{n+1}{n} \right)^n \right\}_{n=1}^{\infty}$ |
| 2. $\left\{ \frac{-9 + (-1)^n}{n!} \right\}_{n=1}^{\infty}$ | 4. $\left\{ \frac{2n - \sqrt{n}}{n} \right\}_{n=1}^{\infty}$ |

Determine if the following sequences are increasing or decreasing:

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|--------------------------------------------------------|-------------------------------------|
| 5. $\left\{ 7 - \frac{1}{n^2} \right\}_{n=1}^{\infty}$ | 7. $\{ne^{-n}\}_{n=1}^{\infty}$ |
| 6. $\left\{ \frac{2^n}{n!} \right\}_{n=4}^{\infty}$ | 8. $\{12 \sin(3n)\}_{n=1}^{\infty}$ |

9. Use the fact that $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$ to find $\sum_{n=3}^{\infty} \frac{1}{n^2}$

Determine if the following series converge or diverge, and if it converges, find the sum:

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|------------------------------------------------|--------------------------------------------------------------------------|
| 10. $\sum_{n=0}^{\infty} \frac{1}{3^n}$ | 14. $\sum_{n=0}^{\infty} 0.5 \left(-\frac{4}{3} \right)^n$ |
| 11. $\sum_{n=1}^{\infty} 2(-0.9)^n$ | 15. $\sum_{n=0}^{\infty} \left(\frac{\sqrt{5}}{1 + \sqrt{5}} \right)^n$ |
| 12. $\sum_{n=1}^{\infty} \frac{n-6}{n}$ | 16. $\sum_{n=1}^{\infty} \left(\frac{1}{n} - \frac{1}{n+2} \right)$ |
| 13. $\sum_{n=1}^{\infty} \frac{1}{1 + e^{-n}}$ | 17. $\sum_{n=1}^{\infty} \frac{1}{n^2 + 4n + 3}$ |
| | 18. $\sum_{n=1}^{\infty} \frac{1}{n(n+2)}$ |

Answers

1. 0

2. 0

3. e

4. 2

5. Increasing

6. Decreasing

7. Decreasing

8. Neither

9. $\sum_{n=3}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6} - \left(1 + \frac{1}{4}\right)$

10. Converge, $\frac{3}{2}$

11. Converge, $-\frac{18}{19}$

12. Diverges

13. Diverges

14. Diverges

15. Converge, $1 + \sqrt{5}$

16. Converge, $\frac{3}{2}$

17. Converge, $\frac{5}{12}$

18. Converge, $\frac{3}{4}$