Math 122 - #19
Sequences

Find the limit of the following sequences:

1. $\left\{\left(1+\frac{1}{n}\right)^n\right\}_{n=1}^{\infty}$

2. $\{3+(-1)^n\}_{n=1}^{\infty}$

3. $\left\{\frac{3n^2-n+4}{2n^2+1}\right\}_{n=1}^{\infty}$

4. $\left\{\frac{3^n}{4^n}\right\}_{n=1}^{\infty}$

5. $\left\{n\sin\frac{1}{n}\right\}_{n=1}^{\infty}$

6. $\left\{\frac{1+(-1)^n}{n}\right\}_{n=1}^{\infty}$

7. $\left\{\frac{\sqrt{n}}{1+\sqrt{n}}\right\}_{n=1}^{\infty}$

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

Determine if the following sequences are increasing, decreasing or neither. Discuss the boundedness of the sequence.

9. $\left\{4-\frac{1}{n}\right\}_{n=1}^{\infty}$

10. $\left\{\frac{4n}{n+1}\right\}_{n=1}^{\infty}$

11. $\left\{\frac{\cos n}{n}\right\}_{n=1}^{\infty}$

Answers

1. e

2. D.N.E.

3. $\frac{3}{2}$

4. 0

5. 1

6. 0

7. 1

8. 0

9. Increasing, bounded between 3 and 4

10. Increasing, bounded between 2 and 4

11. Neither, bounded between -1 and 1