

- 1 Find a formula for the general term  $a_n$  of the sequence, where  $n = 1, 2, 3, \dots$ , assuming that the pattern of the first few terms continues.

$$\{2, 9, 16, 23, \dots\}$$

- a.  $7n + 2$       b.  $7n - 5$       c.  $14n - 5$       d.  $14n + 2$       e.  $7n + 9$

**Problem**

code: stet.

11.01.11m

- 2 Find a formula for the general term  $a_n$  of the sequence, assuming that the pattern of the first few terms continues. Formulate your answer so that the sequence starts at  $n = 1$ .

$$\left\{1, -\frac{2}{7}, \frac{4}{49}, -\frac{8}{343}, \dots\right\}$$

- a.  $\left(\frac{2}{7}\right)^{n-1}$       c.  $\left(-\frac{2}{7}\right)^n$       e.  $\left(-\frac{7}{2}\right)^{n-1}$   
b.  $\left(-\frac{2}{7}\right)^{n-1}$       d.  $\left(\frac{7}{2}\right)^n$

**Problem**

code: stet.

11.01.13m

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

$$a_n = \frac{n+6}{7n-1}$$

- a.  $\frac{1}{7}$       b.  $\frac{1}{10}$       c.  $\frac{1}{8}$       d.  $\frac{1}{9}$       e. Diverges

**Problem**

code: stet.

11.01.16m

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

$$a_n = \frac{\sqrt{n}}{3 + \sqrt{n}}$$

- a. 1      b. 0      c.  $\frac{1}{5}$       d.  $\frac{1}{4}$       e. Diverges

**Problem**

code: stet.

11.01.18m

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

$$a_n = \frac{n}{9 + \sqrt{n}}$$

- a.  $\frac{1}{10}$       b.  $\frac{1}{9}$       c.  $\frac{1}{12}$       d.  $\frac{1}{11}$       e. Diverges

**Problem****code:** stet.

11.01.20m

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

$$a_n = \frac{(-1)^n n^3}{n^3 + 7n^2 + 7}$$

- a. 1      b. 0      c. - 1      d.  $\frac{1}{7}$       e. Diverges

**Problem****code:** stet.

11.01.22m

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

$$a_n = \cos\left(\frac{8}{n}\right)$$

- a. - 1      b. 0      c. 1      d.  $\cos 8$       e. Diverges

**Problem****code:** stet.

11.01.24m

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

$$\{\arctan 10n\}$$

- a. 1      b.  $\frac{\pi}{2}$       c.  $5\pi$       d. 0      e. Diverges

**Problem****code:** stet.

11.01.26m

$$9 \quad \left\{ \frac{\ln n}{\ln 5n} \right\}$$

(a) Determine whether the sequence converges or diverges.

\_\_\_\_\_ ( ? )

(b) If it converges, find the limit.

\_\_\_\_\_ ( ? )

**Problem**

**code:**

stet.

11.01.28

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

$$\left\{ n^7 \cos n\pi \right\}$$

a. 1

b.  $\pi$

c. - 1

d. 0

e. Diverges

**Problem**

**code:** stet.

11.01.30m

$$11 \quad a_n = \ln(n + 6) - \ln n$$

(a) Determine whether the sequence converges or diverges.

\_\_\_\_\_ ( ? )

(b) If it converges, find the limit.

\_\_\_\_\_ ( ? )

**Problem**

**code:**

stet.

11.01.32

$$12 \quad a_n = \sqrt{n} - \sqrt{n^2 - 7}$$

(a) Determine whether the sequence converges or diverges.

\_\_\_\_\_ ( ? )

(b) If it converges, find the limit.

\_\_\_\_\_ ( ? )

**Problem**

**code:**

stet.

11.01.34

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

$$a_n = \frac{\sin 3n}{6 + \sqrt{n}}$$

- a.  $\frac{1}{10}$       b.  $\frac{1}{6}$       c. 0      d.  $\frac{1}{9}$       e. Diverges

**Problem****code:** stet.

11.01.36m

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

$$a_n = 7 + \left(-\frac{2}{\pi}\right)^n$$

- a. 8      b. 6      c. 9      d. 7      e. Diverges

**Problem****code:** stet.

11.01.42m

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

$$\left\{ \arctan \left( \frac{5n}{5n + 8} \right) \right\}$$

- a. 0      b.  $\frac{\pi}{2}$       c.  $\frac{\pi}{4}$       d. 1      e. Diverges

**Problem****code:** stet.

11.01.43m

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

$$a_n = \frac{n^8}{n!}$$

- a. 1      b. 5      c. 8      d. 0      e. Diverges

**Problem****code:** stet.

11.01.45m

17 Find the value of the limit of the sequence defined by

$$a_1 = \sqrt{10}, \quad a_{n+1} = \sqrt{10 + a_n}.$$

- a.  $\frac{1 - \sqrt{11}}{2}$       b.  $\frac{1 - \sqrt{11}}{4}$       c.  $\frac{1 + \sqrt{11}}{2}$       d.  $\frac{1 + \sqrt{41}}{2}$       e.  $\frac{1 - \sqrt{41}}{2}$

**Problem****code:** stet.

11.01.53m

18  $a_n = \frac{1}{5^n}$

(a) Determine whether the sequence is increasing, decreasing, or non monotonic.

\_\_\_\_\_ (?)

(b) Is the sequence bounded?

\_\_\_\_\_ (?)

**Problem**

**code:**

stet.

11.01.54

19 Determine whether the sequence is increasing, decreasing, or non monotonic.

$$a_n = \frac{7n - 8}{9n + 10}$$

- a. non monotonic      b. decreasing      c. increasing

Is the sequence bounded?

- a. yes      b. no

**Problem**

**code:** stet.

11.01.56m

20 Determine whether the sequence is increasing, decreasing, or non monotonic.

$$a_n = 10n + \frac{10}{n}$$

- a. increasing      b. decreasing      c. non monotonic

Is the sequence bounded?

- a. yes      b. no

**Problem**

**code:** stet.

11.01.60m

21 Find the value of the limit of the sequence defined by  $a_1 = 1$ ,  $a_{n+1} = 5 - \frac{1}{a_n}$

a.  $\frac{5 - \sqrt{21}}{2}$

b.  $\frac{5 + \sqrt{26}}{2}$

c.  $\frac{5 - \sqrt{26}}{2}$

d.  $\frac{5 + \sqrt{21}}{2}$

e.  $\frac{5 + \sqrt{29}}{2}$

**Problem**

**code:** stet.

11.01.63m

ANSWER KEY

Homework 11.1 Math 19B Winter 2007, Bauerle

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- |       |                  |       |                       |                     |            |       |
|-------|------------------|-------|-----------------------|---------------------|------------|-------|
| 1. b  | 2. b             | 3. a  | 4. a                  | 5. e                | 6. e       | 7. c  |
| 8. b  | 9. converge<br>1 | 10. e | 11. converge<br>0     | 12. diverge<br>none | 13. c      | 14. d |
| 15. c | 16. d            | 17. d | 18. decreasing<br>yes | 19. c<br>a          | 20. a<br>b | 21. d |