Homework 07

● Graded

Student

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Total Points

10 / 10 pts

Question 1

Completion

8 / 8 pts

✔ **– 0 pts** Complete

– 2 pts Mostly complete

– 4 pts Half complete

– 6 pts Mostly incomplete

– 8 pts Incomplete

Question 2

Correctness of 11.1#80

2 / 2 pts

✔ **– 0 pts** Correct

– 1 pt Partially correct

– 2 pts Incomplete or incorrect

Homework 7

Section 11.1

7.] $a_n = \frac{(-1)^{n-1}}{n^2}$ $a_1 = 1$ $a_2 = -\frac{1}{4}$ $a_3 = \frac{1}{9}$

$a_4 = -\frac{1}{16}$ $a_5 = \frac{1}{25}$

14.) $a_1 = 6$, $a_{n+1} = \frac{a_n}{n}$ $a_2 = 6$ $a_3 = 3$ $a_4 = 1$

$a_5 = \frac{1}{4}$

18.) $a_1 = 4$ $a_2 = -1$ $a_n = 4 \cdot \left(-\frac{1}{4}\right)^{n-1}$

20.) $a_1 = 5$ $a_2 = 8$ $a_n = d(n-1)$

$d = 3$ $a_n = 3n + 2$

32.) $a_1 = 1$ $a_2 = 0$ $\sin\left(\frac{n\pi}{2}\right)$

$\sin\left(\frac{\pi}{2}\right) = 1$ $\sin(\pi) = 0$ $\sin\left(\frac{3\pi}{2}\right) = -1$ ✓

$a_n = \sin\left(\frac{n\pi}{2}\right)$

32.] $a_n = 2 + (0.8c)^n$

$\lim_{n\to\infty} a_n = \lim_{n\to\infty} 2 + (0.8c)^n = 2 + 0 = 2.$ Converges to 2

34.) $a_n = \frac{3\sqrt{n}}{\sqrt{n} + 2}$ $\lim_{n\to\infty} \frac{3\sqrt{n}}{\sqrt{n} + 2} = \lim_{n\to\infty} \frac{\frac{3\sqrt{n}}{\sqrt{n}}}{\frac{\sqrt{n} + 2}{\sqrt{n}}} =$

$\lim_{n\to\infty} \frac{3}{1 + \frac{2}{\sqrt{n}}} = \frac{3}{1} = 3.$

Converges at 3

36.) $a_n = \frac{4^n}{1+q^n} = \lim_{n\to\infty} \frac{4^n}{1+q^n} = \lim_{n\to\infty} \frac{\frac{4^n}{q^n}}{\frac{1}{q^n}+\frac{q^n}{q^n}} = \frac{0}{0+1} = 0$

Converges to 0.

38.) $a_n = \cos\left(\frac{n\pi}{n+1}\right)$ $\lim_{n\to\infty} \cos\left(\frac{n\pi}{n+1}\right) = \lim_{n\to\infty} \cos\left(\frac{n\pi \cdot \frac{1}{n}}{n+1 \cdot \frac{1}{n}}\right)$

$= \lim_{n\to\infty} \cos\left(\frac{\pi}{1+\frac{1}{n}}\right) = \cos\pi = -1.$ Converges to -1

40.) $a_n = e^{2n/n+2}$ $\lim_{n\to\infty} e^{\left(\frac{2n\cdot\frac{1}{n}}{n+2\cdot\frac{1}{n}}\right)} = \lim_{n\to\infty} e^{2/1+\frac{2}{n}} = e^{2/1+0} = e^2$

Converges to e^2

80.) $f(x) = \frac{1-x}{2+x}$

$f'(x) = \frac{-3}{(2+x)^2} < 0$ always negative. Decreasing

$\lim_{+\infty} \frac{1-x}{2+x} = \frac{-\infty}{\infty} = -1.$ Sequence is Bounded and Decreasing at -1

84.) $f(x) = x^3 - 3x + 3$

$f'(x) = 3x^2 - 3 > 0$ positive. Increasing

$\lim_{x\to\infty} x^3 - 3x + 3 = \infty$ not bounded

Sequence is monotonic and not bounded

Section 11.2

3.) $\lim_{n\to\infty} 2 - 3(0.8)^n = 2 - 0 = 2$

So $s_n \to 2$ as $n \to \infty$

8.) $\sum_{n=1}^{8} (-1)^n \cdot n = -1+1-2+2-3+3-4+4 = 0$

divergent!