Madi
Dann

11.4

3. $\sum_{n=1}^{\infty} \frac{n}{2n^3+1}$

$\leq \frac{n}{2n^3}$

$= \frac{1}{2} \sum_{n=1}^{\infty} \frac{n}{n^3}$

$= \frac{1}{2} \sum_{n=1}^{\infty} \frac{1}{n^2}$

Since $\sum_{n=1}^{\infty} \frac{1}{n^2}$ converges, so does the original by comparison

5. $\sum_{n=1}^{\infty} \frac{n+1}{n\sqrt{n}}$

$\sum_{n=1}^{\infty} \frac{n}{n\sqrt{n}} + \sum_{n=1}^{\infty} \frac{1}{n\sqrt{n}}$

$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} + \sum_{n=1}^{\infty} \frac{1}{n\sqrt{n}}$

Since $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$ diverges, so does the original by comparison

7. $\sum_{n=1}^{\infty} \frac{9^n}{3+10^n} \leq \sum_{n=1}^{\infty} \frac{9^n}{10^n}$

Since $\sum_{n=1}^{\infty} \frac{9^n}{10^n}$ converges, so does original by comparison.

Sydni, Nathan

3. $\sum_{n=1}^{\infty} \frac{n}{2n^3+1} \leq \sum_{n=1}^{\infty} \frac{n}{2n^3}$ converges

5. $\sum_{n=1}^{\infty} \frac{n+1}{n\sqrt{n}} \geq \sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} = \sum_{n=1}^{\infty} \frac{1}{n^{1/2}}$ diverges

7. $\sum_{n=1}^{\infty} \frac{9^n}{3+10^n} \leq \sum_{n=1}^{\infty} \left(\frac{9}{10}\right)^n$ converges

17. $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n^2+1}} \leq \sum_{n=1}^{\infty} \frac{1}{n}$ diverges

21. $\sum_{n=1}^{\infty} \frac{\sqrt{n+2}}{2n^2+n+1} \leq \sum_{n=1}^{\infty} \frac{(n+2)^{1/2}}{2n^2}$ convergent

27. $\sum_{n=1}^{\infty} \left(1+\frac{1}{n}\right)^2 e^{-n} \geq \sum_{n=1}^{\infty} e^{-n}$

$\lim_{n\to\infty} \frac{e^{-n}}{\left(1+\frac{1}{n}\right)^2 e^{-n}} = 1$ converges since $\sum_{n=1}^{\infty} e^{-n}$ converges so does $\sum_{n=1}^{\infty} \left(1+\frac{1}{n}\right)^2 e^{-n}$ by limit comparison

Karissa Vandenberg
Bailey Weite
Tyler Smith

11.4

3. $\sum_{n=1}^{\infty} \frac{n}{2n^3+1} \le \sum_{n=1}^{\infty} \frac{1}{2n^2}$

Since $\sum_{n=1}^{\infty} \frac{1}{2n^2}$ converges (proven in class), so does $\sum_{n=1}^{\infty} \frac{n}{2n^3+1}$

5. $\sum_{n=1}^{\infty} \frac{n+1}{n\sqrt{n}} \ge \frac{1}{n^{1/2}}$

Since $\sum_{n=1}^{\infty} \frac{1}{n^{1/2}}$ diverges (proven in class), so does $\sum_{n=1}^{\infty} \frac{n+1}{n\sqrt{n}}$.

7. $\sum_{n=1}^{\infty} \frac{9^n}{3+10^n} \le \left(\frac{9}{10}\right)^n$

Since $\sum_{n=1}^{\infty} \left(\frac{9}{10}\right)^n$ converges (proven in class), so does $\sum_{n=1}^{\infty} \frac{9^n}{3+10^n}$.

17. $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n^2+1}} \le \frac{1}{n}$

$\lim_{n\to\infty} \frac{1/\sqrt{n^2+1}}{1/n} = \lim_{n\to\infty} \frac{n}{\sqrt{n^2+1}}$

Travis, Trip, Taylor

11.4 #3) $\sum_{n=1}^{\infty} \frac{n}{2n^3+1}$

$\sum_{n=1}^{\infty}\left(\frac{1}{2n^2} \geq \frac{n}{2n^3+1}\right)$

$\frac{1}{2}\sum_{n=1}^{\infty} \frac{1}{n^2}$ since $p = 2$ and $p > 1$ converges $\frac{1}{2n^2} \geq \frac{n}{2n^3+1}$ $\frac{n}{2n^3+1}$ converges

#5) $\frac{n+1}{n(\sqrt{n})}$ $\sum_{n=1}^{\infty} \frac{\cancel{n}}{\cancel{n}(\sqrt{n})} \leq \frac{n+1}{n(\sqrt{n})}$ Diverges

$\frac{1}{n^{1/2}}$

#7 $\frac{9^n}{3+10^n} \leq \frac{9^n}{10^n}$ $\left(\frac{9}{10}\right) \sum_{n=1}^{\infty} \left(\frac{9}{10}\right)^{n+1}$ Converges

$r = 9/10$ $-1 \leq r \leq 1$

Andrew Maaske
Alli Kalal
Seth Lindgren

11.4

3, 5, 7, 17, 21, 27

3) $\sum_{n=1}^{\infty} \frac{n}{2n^3+1}$ converges. Compare to $\sum_{n=1}^{\infty} \frac{n}{2n^3} = \sum_{n=1}^{\infty} \frac{1}{2n^2}$

$\sum_{n=1}^{\infty} \frac{n}{2n^3+1} \le \frac{1}{2}\sum_{n=1}^{\infty} \frac{1}{n^2}$

$\boxed{\text{Since } \frac{1}{2}\sum_{n=1}^{\infty} \frac{1}{n^2} \text{ converges, then so does } \sum_{n=1}^{\infty} \frac{n}{2n^3+1}.}$

5. $\sum_{n=1}^{\infty} \frac{n+1}{n\sqrt{n}}$ diverges $= \sum_{n=1}^{\infty} \frac{n+1}{n^{3/2}}$ Compare to $\sum_{n=1}^{\infty} \frac{n}{n^{3/2}} = \sum_{n=1}^{\infty} \frac{1}{n^{1/2}}$

$\sum_{n=1}^{\infty} \frac{n+1}{n^{3/2}} \ge \sum_{n=1}^{\infty} \frac{1}{n^{1/2}}$

$\boxed{\text{Since } \sum_{n=1}^{\infty} \frac{1}{n^{1/2}} \text{ diverges, then so does } \sum_{n=1}^{\infty} \frac{n+1}{n\sqrt{n}}}$

7) $\sum_{n=1}^{\infty} \frac{9^n}{3+10^n}$ guess: Converges compare to $\sum_{n=1}^{\infty} \left(\frac{9}{10}\right)^n$

$\sum_{n=1}^{\infty} \frac{9^n}{3+10^n} \le \sum_{n=1}^{\infty} \left(\frac{9}{10}\right)^n$

$\boxed{\text{Since } \sum_{n=1}^{\infty} \left(\frac{9}{10}\right)^n \text{ converges, then so does } \sum_{n=1}^{\infty} \frac{9^n}{3+10^n}}$

Riley S.
Jaret P.
Tyler P.

11.4 3-17-14

(3) $\frac{n}{2n^3+1} \leq \frac{1}{n^2}$ convergent

(5) $\frac{n+1}{n\sqrt{n}} = \frac{n}{n^{3/2}} \geq \frac{1}{n^{1/2}}$ divergent

(7) $\frac{9^n}{3+10^n} \leq \left(\frac{9}{10}\right)^n$ $r<1$ convergent

(17) $\frac{1}{\sqrt{n^2+1}} \leq \frac{1}{n}$ $p=1$ divergent

(21) $\frac{\sqrt{n+2}}{2n^2+n+1} \leq \frac{\sqrt{n}}{n^2} = \frac{1}{n^{3/2}}$ convergent

(27) $\left(1+\frac{1}{n}\right)^2 e^{-n}$ $\frac{1+\frac{2}{n}+\frac{1}{n^2}}{e^n}$ convergent

because e^n will grow fast enough for the top not to keep up.

$$\frac{1+\frac{2}{n}+\frac{1}{n^2}}{e^n} \geq \frac{1}{e^n} \leftarrow \text{convergent}$$