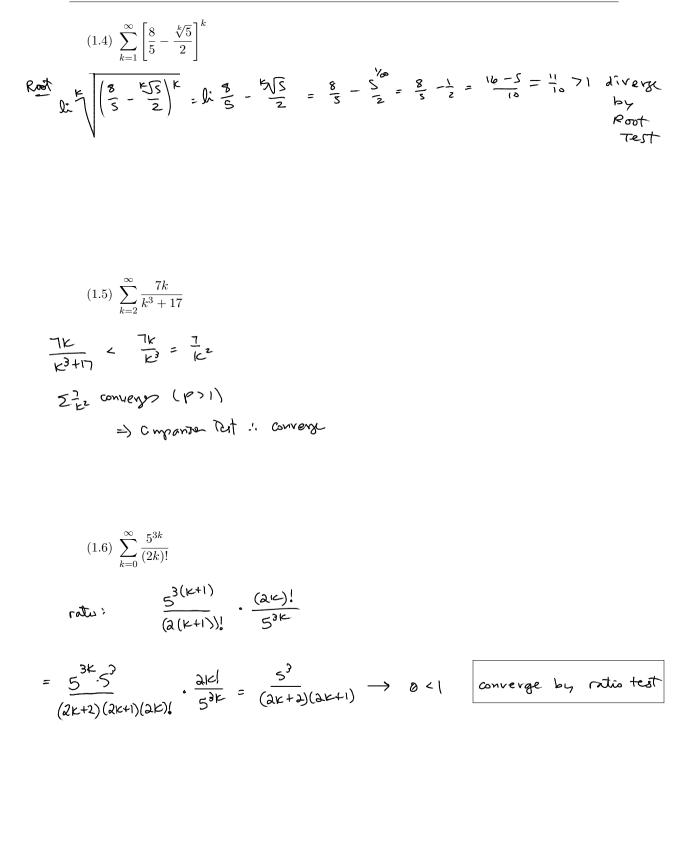
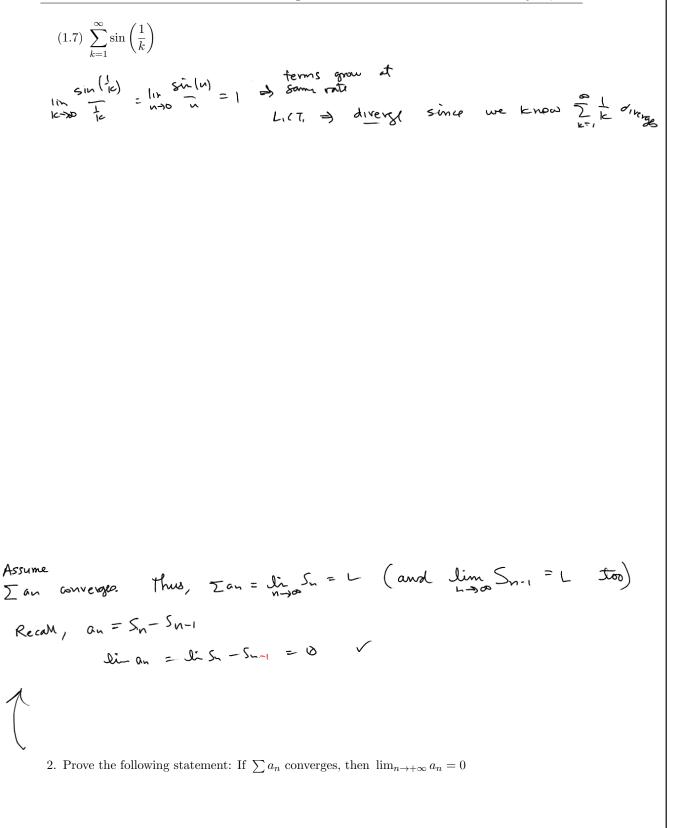
Math 163 - Calculus - Exam 2 - Guide Name: February 20, 2025 Show your work to receive full credit. 1. In each of the following, determine convergence/divergence. Indicate which test(s) you are using. (1.1) Indicate absolute convergence, conditional convergence or divergence $\sum \left| \frac{(-1)^n}{2n} \right| = \sum \left\{ \frac{1}{n} \right\} \rightarrow \infty$ Hormonic Service Conditional Convergence $(1.2) \sum_{k=2}^{\infty} \frac{2k\sqrt[3]{k}}{3k^2 + 5k + 1}$ L.L.T. w/ $2k\sqrt[3]{K} = \frac{2}{3K^2}$ $\frac{2k}{2k} + \frac{3k^2}{2} = \lim_{k \to \infty} \frac{6k^2}{6k^2 + 5k + 1} = 1 \implies basically same sequences$ since $\sum_{3K^{2/3}}^{2}$ diverges (p-test) This series diverges (1.3) $\sum_{k=1}^{\infty} \cos\left(\frac{1}{k^2}\right)$ LICIT $\lim_{k \to \infty} \frac{\cos\left(\frac{1}{k^2}\right)}{\frac{1}{k^2}} = \lim_{u \to 0} \frac{\cos(u)}{u} = \frac{1}{0} \rightarrow \infty \implies ?$ Div. Test: lim cos(1/2) = 1 diverse





3. Find the value of the convergent series below:

$$(3.1) \sum_{k=1}^{+\infty} \frac{2^{k+1}}{3^{k-1}} = \frac{2 \cdot 2^{k}}{3^{-1} 3^{k}} = 4 \cdot \left(\frac{2}{3}\right)^{k} = \frac{4}{1/3} = 18$$

$$(3.2) \sum_{k=2}^{+\infty} \left[64^{1/k} - 64^{1/(k+2)} \right]$$

$$S_{2} = 64^{1/2} - 64^{1/4} + 64^{1/3} - 64^{1/5}$$

$$S_{3} = 64^{1/2} - 64^{1/4} + 64^{1/3} - 64^{1/5} + 64^{1/4} - 64^{1/6} = 64^{1/2} + 64^{1/3} - 64^{1/5} + 64^{1/5} + 64^{1/5}$$

4. Give three examples (each) of . . .

(4.1) a divergent alternating series

$$-1+1-1+1-1+1$$
,... = $\Sigma(-1)^n$
 $\Sigma 3(-1)^n + 5$
 $\Sigma n(-1)^n$

(4.2) a conditionally convergent alternating series. $\sum_{k \in 1, 2, 3} \kappa \left(\frac{-1}{n}\right)^{n}$ $\kappa_{z,1,2,3}$

(4.3) an absolutely convergent alternating series

$$\sum_{k=1, 2, 3}^{k \cdot (-1)^{n}}$$

(4.4) a decreasing *sequence* that converges to $\ln 7$.

(4.5) a strictly increasing *sequence* that converges to e.

$$\begin{cases} e - \frac{k}{n} \end{cases} \quad k = 1, 2, 3$$

$$\begin{cases} \frac{n}{n+1} \cdot e \end{cases} \qquad e^{\infty} \end{cases}$$