Quiz 4a **Calc 2** **4/30/2003**

Each problem is worth 5 points. For full credit provide complete justification for your answers.

1. Determine whether the series $\sum_{n=1}^{\infty} \frac{3}{2+5^n}$ converges or diverges.

$2+5^n > 5^n$

$\frac{1}{2+5^n} < \frac{1}{5^n}$

$\frac{3}{2+5^n} < \frac{3}{5^n}$

geom. series which must converge

Since $\sum_{n=1}^{\infty} \frac{3}{2+5^n}$ is less than $\sum_{n=1}^{\infty} \frac{3}{5^n}$ which is a convergent geom. series, then according to the comparison test, $\sum_{n=1}^{\infty} \frac{3}{2+5^n}$ must converge.

Excellent!

2. Determine whether the series $\sum_{n=0}^{\infty} 4\left(\frac{-3}{2}\right)^n$ converges or diverges.

geometric series

$a=4$

$r=(-3/2)$ $|r| = 3/2 > 1$, so the series diverges.

Great

3. Determine whether the series $\sum_{n=1}^{\infty} \frac{n+3}{n^2}$ converges or diverges.

$$\lim_{n\to\infty} \frac{\frac{1}{n}}{\frac{n+3}{n^2}} \qquad \lim_{n\to\infty} \frac{1}{n} \cdot \frac{n^2}{n+3} \qquad \lim_{n\to\infty} \frac{n}{n+3} \qquad \lim_{n\to\infty} \frac{1}{1+3/n} = 1$$

$1 > 0$ and finite

Since $\sum \frac{1}{n}$ diverges $\sum \frac{n+3}{n^2}$ must diverge as well, by the limit comparison test.

Nice Job.