Review for 9.1 – 9.4 NO 9.3

Give an example of an arithmetic sequence.

Do arithmetic sequences converge or diverge?

Give an example of a geometric sequence.

Do geometric series converge or diverge?

Do the following sequences converge or diverge? If it converges, give the value it converges to.

$a_n = \frac{2n}{n+3}$

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

$a_n = (1.1)^n$

$a_n = \cos(\frac{n\pi}{2})$

$$lim_{x\to 0}\frac{e^{2x}-1}{tanx}=$$

$$lim_{h\to 0}\frac{1}{h}\ln\left(\frac{2+h}{h}\right)=$$

$$lim_{x\to 0}\frac{1-cos^2(2x)}{x^2}=$$

$$lim_{n\to\infty}\frac{4n^2}{n^2+10{,}000n}=$$

$$lim_{x\to 0}(xcscx)=$$

$lim_{x\to\frac{\pi}{4}} \frac{\sin(x-\frac{\pi}{4})}{x-\frac{\pi}{4}} =$

$lim_{x\to\infty}(1+5e^{x})^{\frac{1}{x}} =$

If $f'(x) = cosx$ and $g'(x) = 1$ for all x, and if $f(0) = g(0) = 0$, then $lim_{x\to 0}\frac{f(x)}{g(x)} =$

If k is a positive integer, then $lim_{x\to +\infty}\frac{e^{k}}{e^{x}}$ is

A) 0 B) 1 C) e D) $k!$ E) nonexistent

$lim_{n\to\infty}\frac{3n^3-5n}{n^3-2n^2+1} =$

$lim_{x\to 0}\frac{1-cosx}{2sin^2x} =$

Let f and g be functions that are differentiable for all real numbers, with $g(x) \neq 0$ for $x \neq 0$. If $lim_{x\to 0} f(x) = lim_{x\to 0} g(x) = 0$ and $lim_{x\to 0} \frac{f'(x)}{g'(x)}$ exists, then $lim_{x\to 0} \frac{f(x)}{g(x)}$ is

$$lim_{h\to 0} \frac{e^h - 1}{2h} =$$

$$lim_{x\to 1} \frac{\int_1^x e^{t^2}\, dt}{x^2 - 1}$$

$$lim_{x\to 0} \frac{e^x - cosx - 2x}{x^2 - 2x} =$$

Evaluate the integral with a number or by stating it diverges.

$$\int_{-1}^{1} \frac{3}{x^2} dx =$$

$$\int_2^{+\infty} \frac{dx}{x^2} =$$

$$\int_4^{\infty} \frac{-2x}{\sqrt[3]{9 - x^2}}\,dx =$$

$$\int_1^{\infty} \frac{x}{(1+x^2)^2}\,dx =$$

$$\int_0^{\infty} x^2 e^{-x^3}\,dx =$$

Let R be the region between the graph of $y = e^{-2x}$ and the x-axis for $x \geq 3$. The area of R is