Name: _____ Date: _____ Period: _____ 2016

AP Calculus – L'Hopital's Rule

Use L'Hopital's Rule to answer the following limits.

1. $\lim_{x\to\infty}\frac{e^x}{x^2}$

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

3. $\lim_{x\to\infty}\frac{\sqrt{x^2+2}}{\sqrt{2x^2+1}}$

4. $\lim_{x\to\infty} x\sin(\pi/x)$

5. $\lim_{x\to\infty} x^3 e^{-x^2}$

6. $\lim_{x\to 0^+}\sin x \ln x$

Use the ratio test, $\lim_{n\to\infty}\left|\frac{a_{n+1}}{a_n}\right|$, and L'Hopital's Rule to determine the value of the limit given the function a_n.

7. $a_n = \frac{1}{3^n}$

8. $a_n = \frac{(x+1)^n}{n!}$

9. $a_n = \frac{(x^2-4)^{n-1}}{n^2+2n}$

10. $a_n = \frac{n^n}{n!}$

11. $a_n = \frac{10^n}{(n+1)4^{2n+1}}$

12. $a_n = (-1)^n \frac{n}{\sqrt{n^3+2}}$