Calculus AB Name_____

Worksheet 18 - Limits and L'Hopital's Rule

Period____

Evaluate each limit using L'Hôpital's Rule. Hint: write each as a quotient of two functions.

1) $\lim\limits_{x \to \frac{\pi}{2}} \left(2\sec x - 2\tan x\right)$

2) $\lim\limits_{x \to 0} \dfrac{3x}{\ln\left(x + 1\right)}$

3) $\lim\limits_{x \to 0^+} 2x \ln x$

4) $\lim\limits_{x \to \infty} \left(\dfrac{x^2}{x - 1} - \dfrac{x^2}{x + 1}\right)$

Evaluate each limit. Use L'Hôpital's Rule if it can be applied. If it cannot be applied, evaluate using another method and write a * next to your answer.

5) $\lim\limits_{w \to 0} \dfrac{5\left(e^w - 1 - w\right)}{1 - \cos w}$

6) $\lim\limits_{w \to \infty} \dfrac{\ln\left(w + 3\right)^4}{\ln w^4}$

7) $\lim\limits_{s \to 0} \dfrac{s^2}{e^s - s}$

8) $\lim\limits_{r \to 0} \dfrac{2\left(e^r - r\right)}{r^2}$

Evaluate each limit.

9) $\lim\limits_{s \to 1} \dfrac{s^2 - 4s + 3}{s - 1}$

10) $\lim\limits_{t \to 3} -\dfrac{t - 3}{t^2 - 2t - 3}$

11) $\lim\limits_{s \to -1^+} h(s),\ h(s) = \begin{cases} -3, & s < -1 \\ -\dfrac{s}{2} - \dfrac{7}{2}, & s \geq -1 \end{cases}$

12) $\lim\limits_{s \to -1^-} \dfrac{2s + 2}{|s + 1|}$

13) $\lim\limits_{r \to 0} \dfrac{\tan\left(\dfrac{\pi}{6} + r\right) - \tan\dfrac{\pi}{6}}{r}$

14) $\lim\limits_{t \to 0} \dfrac{\sqrt{4 + t} - \sqrt{4}}{t}$

15) $\lim\limits_{t \to 0} \dfrac{\left(\dfrac{1}{2} + t\right)^3 - \left(\dfrac{1}{2}\right)^3}{t}$

16) $\lim\limits_{r \to 0} \dfrac{\ln\left(8 + r\right) - \ln 8}{r}$

