6.8 l'Hospital's Rule - Extra Practice Problems

1. $\displaystyle\lim_{x\to\pi/2}\frac{\cos^2 x}{\sin x - 1}$

2. $\displaystyle\lim_{x\to 0}\frac{e^x - x - 1}{\cos x - 1}$

3. $\displaystyle\lim_{x\to\infty}\frac{\sqrt{x}}{(\ln x)^2}$

4. $\displaystyle\lim_{x\to 0}\left(\frac{1}{\sin x} - \frac{1}{x}\right)$

5. $\displaystyle\lim_{x\to 0}\sin x \ln x$

6. $\displaystyle\lim_{x\to 1}\frac{e^x - e}{\ln x}$

7. $\displaystyle\lim_{x\to\infty} x^{1/x}$

8. $\displaystyle\lim_{x\to\infty}\frac{3x - 1}{7 - 12x}$

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

10. $\displaystyle\lim_{x\to 0}\frac{\cos x - \cos^2 x}{\sin x}$

11. $\displaystyle\lim_{x\to 0}\frac{\sin 4x}{\sin 3x}$

12. $\displaystyle\lim_{x\to 0}\left(\cot x - \frac{1}{x}\right)$

13. $\displaystyle\lim_{x\to 1}\frac{x(\ln x - 1) + 1}{(x-1)\ln x}$

14. $\displaystyle\lim_{x\to 0}\frac{\sin x - x\cos x}{x - \sin x}$

15. $\displaystyle\lim_{x\to 1}\frac{1 - x + \ln x}{1 + \cos\pi x}$

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

17. $\displaystyle\lim_{x\to 0_+}(\cos x)^{1/x^2}$

18. $\displaystyle\lim_{x\to 1_+}\ln x \tan\left(\frac{\pi x}{2}\right)$

19. $\displaystyle\lim_{x\to 0}(1 - 2x)^{1/x}$

20. $\displaystyle\lim_{x\to 0_+}\left(\frac{1}{x} - \frac{1}{e^x - 1}\right)$

21. $\displaystyle\lim_{x\to 0_+} x^{\sqrt{x}}$

22. $\displaystyle\lim_{x\to\infty}(x - \ln x)$

23. $\displaystyle\lim_{x\to 1_+} x^{1/(1-x)}$

24. $\displaystyle\lim_{x\to 0}\frac{\cos x - 1 + \frac{1}{2}x^2}{x^4}$

25. $\displaystyle\lim_{x\to\infty} x\sin\left(\frac{\pi}{x}\right)$.