

Math 131H: Final practice problems

1. Compute the following limits

$$\lim_{x \rightarrow 0} \frac{\tan(x)}{\ln(1 + 2x)}$$

$$\lim_{x \rightarrow \infty} \frac{x^3}{e^{-x^2}}$$

$$\lim_{x \rightarrow 0} \frac{1 - \cos(x)}{x^2 + x}$$

$$\lim_{x \rightarrow 0} \frac{e^{3x^2} - 1}{x^2}$$

$$\lim_{x \rightarrow 0^+} \frac{x^2}{\ln(x)}$$

$$\lim_{x \rightarrow (\pi/2)^-} \tan(x)^{\ln(x)}$$

$$\lim_{x \rightarrow 1^+} \left(\frac{x}{x-1} - \ln(x) \right)$$

2. Sketch the curve of following functions indicating clearly

- The vertical and horizontal asymptotes.
- The intervals where the function is increasing/decreasing
- The local maxima and minima.
- The intervals where the function is concave upward/downward.

$$y = 2xe^{-2x}$$

$$y = e^{2x-x^2}$$

$$y = x + \ln(x + 1)$$

$$y = e^{3x} - e^{5x}$$

$$y = e^{2x} - e^{-3x}$$

$$y = \frac{\sin(x)}{1 + \cos(x)}$$

3. Review problem 52, , p. 349

4. Review problem 53, p.349

5. Review problem 54, p.349

6. Review problem 58, p. 349

7. Review problems 65, 67, 69, 70, 71, p. 350

8. Review problems 77 p. 350

9. A car is traveling at 50 mi/h when the car are full applied, producing a deceleration of 22 ft/s^2 . What is the distance until the car comes to a stop.

10. Problem 44, p.330
11. Problem 47, p. 330
12. Problem 49, p. 330
13. Review problem 3, p. 409
14. Review problem 5, p. 410
15. Review problem 8, p. 410
16. Review problems 9, 10, 11, 13, 14, p. 410
17. Find the antiderivative of

$$f(x) = \frac{2}{3} - \frac{3}{5}x^3 - \frac{2}{9}x^{\frac{2}{3}}.$$

$$f(x) = 6\sqrt{x} - \sqrt[5]{x}$$

$$f(x) = 3e^x + 7\sec^2(x)$$

$$f(x) = 2x(x-1)^3$$

$$f(x) = \frac{5}{2+2x^2}$$

18. Review problems 43, 44, 46, 47, p. 410
19. Review problems 56, p. 411
20. Review problems 60, p. 411
21. Review problem 65, p. 411
22. Review problem 68, p. 411
23. Review problem 37, 38 p. 410