

Math 131H: Midterm 1 practice problems

1. Review problem 1, ch2, p. 167
2. Review problem 2, ch2, p. 167
3. Review problem 3, ch2, p. 167
4. Review problem 18, ch2, p. 167
5. Review problem 20, ch2, p. 167
6. Review problem 14, ch2, p. 167
7. Review problem 12, ch2, p. 167
8. Compute the vertical and horizontal asymptotes for the function

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

To do this you will have to compute several limits (which ones?), show your work for every limit, please. Draw a graph which shows your results.

9. Compute the vertical and horizontal asymptotes for the function

$$f(x) = \sqrt{x^2 + x + 1} - \sqrt{x^2 - x}$$

To do this you will have to compute several limits, show your work for every limit, please. Draw a graph which shows your results.

9. Compute the vertical and horizontal asymptotes for the function

$$f(x) = \sqrt{x^2 + 4x + 1} - x$$

To do this you will have to compute several limits, show your work for every limit, please. Draw a graph which shows your results.

10. Review problem 40, p. 168
11. Review problem 47, p. 168
12. Review problem 48, p. 168
13. Review problem 42, p. 168
14. Using the *definition of the derivative* compute the derivative $f'(x)$ for the functions

1. $\sqrt{2x + 3}$

2. $f(x) = \frac{x}{x-2}$

Show all your work.

15. Find numbers a and b such that

$$\lim_{x \rightarrow 0} \frac{\sqrt{ax + b} - 2}{x} = 1$$

16. Using the appropriate differentiation rules compute the derivative of

1. $f(x) = \sqrt{x} + \frac{1}{\sqrt[3]{x^4}}$

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

3. $f(\theta) = \frac{\sec(\theta)}{1+\tan(\theta)}$

4. $f(t) = \cos(t)(1 + te^t)$

5. $g(t) = e^t \sin(t)(t^2 - 5t + 22)$

6. $f(x) = \cos(x) \frac{x^3 - x^2}{3x}$

Show all your work.

17. Review problem 61, p. 262

18. Review problem 58, p. 262

19. Review problem 79, p. 262

20. Find an equation of the tangent to the curve $y = \sqrt{x} - x$ which is parallel to the curve $x - 4y = 2$.

21. Find an equation of the tangent to the curve $y = e^x$ which passes through the origin.

22. Review problem 85, p.263

23. Find the points x with $0 \leq x \leq 2\pi$ where the function $x + 2\sin(x)$ has an horizontal tangent.

24. Review problem 106, p.264