

MAC2241 Spring 2017
Suggested problems for Test 1
(Test 1 is Monday February 13th, in class)

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1. If $f(x) = x^2$, simplify each of the expressions.

$$\frac{f(3+h) - f(3)}{h}$$

$$\frac{f(x+h) - f(x)}{h}$$

2. If $f(x) = \frac{1}{x}$, simplify each of the expressions.

$$\frac{f(3+h) - f(3)}{h}$$

$$\frac{f(x+h) - f(x)}{h}$$

3. Find the domain of the function.

$$f(x) = \frac{x+4}{x^2-9}$$

4. Find the domain of the function.

$$f(x) = \frac{2x^3-5}{x^2+x-6}$$

5. Find the domain of the function.

$$\sqrt{2-\sqrt{x}}$$

6. Draw a reasonable graph of the function. Label at least three points.

$$f(x) = |x| - 2$$

7. Draw a reasonable graph of the function. Label at least three points.

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

8. Draw a reasonable graph of the function. Label at least three points.

$$f(x) = x^2 + 6x + 4$$

9. Draw a reasonable graph of the function. Label at least three points.

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

10. Find $f \circ g$ and $g \circ f$, and their domains.

$$f(x) = x^2 - 1, \quad g(x) = 2x + 1$$

11. Find $f \circ g$ and $g \circ f$, and their domains.

$$f(x) = x - 2, \quad g(x) = x^2 + 3x + 4$$

12. Find $f \circ g$ and $g \circ f$, and their domains.

$$f(x) = 1 - 3x, \quad g(x) = \cos x$$

13. Find $f \circ g$ and $g \circ f$, and their domains.

$$f(x) = x^{1/2}, \quad g(x) = (1 - x)^{1/3}$$

14. Find the exact value of $\log_5(125)$.

15. Find the exact value of $\log_3(1/27)$.

16. Find the exact value of $\ln(1/e)$.

17. Find the exact value of $\log_{10}(\sqrt{10})$.

18. Find the exact value of $\log_2(6) - \log_2(15) + \log_2(20)$.

19. Solve the equation for x .

$$e^{7-4x} = 6$$

20. Solve the equation for x .

$$\ln(3x - 10) = 2$$

21. Solve the equation for x .

$$\ln(x^2 - 1) = 3$$

22. Solve the equation for x .

$$2^{x-5} = 3$$

23. Find a formula for the n th term of the sequence.

$$1, \frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \frac{1}{9}, \dots$$

24. Find a formula for the n th term of the sequence.

$$1, -\frac{1}{3}, \frac{1}{9}, -\frac{1}{27}, \frac{1}{81}, \dots$$

25. Find a formula for the n th term of the sequence.

$$5, 8, 11, 14, 17, \dots$$

26. Find the first five terms of the recursive sequence.

$$a_0 = 2$$

$$a_1 = 1$$

$$a_n = a_{n-1} + 6a_{n-2} \quad \text{if } n \geq 3$$

27. Evaluate the limit.

$$\lim_{n \rightarrow \infty} \frac{1}{3n^4}$$

28. Evaluate the limit.

$$\lim_{n \rightarrow \infty} \frac{5}{3^n}$$

29. Evaluate the limit.

$$\lim_{n \rightarrow \infty} \frac{3 + 5n}{2 + 7n}$$

30. Evaluate the limit.

$$\lim_{n \rightarrow \infty} 1 - (0.2)^n$$

31. Evaluate the limit.

$$\lim_{n \rightarrow \infty} 2^{-n} + 6^{-n}$$

32. Evaluate the limit.

$$\lim_{n \rightarrow \infty} \frac{n^2}{\sqrt{n^3 + 4n}}$$

33. Evaluate the limit.

$$\lim_{n \rightarrow \infty} \frac{\pi^n}{3^n}$$

34. Evaluate the limit.

$$\lim_{n \rightarrow \infty} \frac{3^{n+2}}{5^n}$$