Math 75A **Maria Nogin**

Practice Final

Notes:

- This practice final and set Math 75A Review (in MyLab) together cover all topics that may appear on the final. You are strongly encouraged to do both of these. Also, review all 3 tests, quizzes, and homework assignments (both on-line and from the book).
- The exam will consist of 25 multiple choice questions. Each question is worth 4 points, for a total of 100 points. You will receive credit if and only if you submit the correct answer. Your work will not be checked.
- You will have 2 hours to complete the exam.
- The final exam counts as 20 percent of your grade.
- Bring a pencil, an eraser, and a scantron form. Scratch paper will be provided.

1. If the graph of $f(x)$ passes through points $(5, 3)$, $(-3, 2)$, $(3, 4)$, and $(0, -3)$, then what is the value of $f(3)$?
   (a) 0
   (b) 2
   (c) 4
   (d) 5
   (e) Cannot be determined (given information is not sufficient)
2. Does the point $(-4, 0)$ lie on, above, or below the line $y = -\frac{1}{3}x + 1$?
   (a) On the line
   (b) Above the line
   (c) Below the line
   (d) Cannot be determined (given information is not sufficient)
   (e) None of the above

3. The domain of the function $f(x) = \sqrt{\dfrac{1-x}{1+x}}$ is the set of all real numbers x for which:
   (a) $x > 1$
   (b) $x \geq 1$
   (c) $-1 < x \leq 1$
   (d) $-1 < x$
   (e) $x \neq -1$
4. If $f(x) = \dfrac{1}{x^2}$ and $g(x) = \sqrt{x}$, then the domain of $f \circ g$ is
   (a) $(-\infty, \infty)$
   (b) $(0, \infty)$
   (c) $[0, \infty)$
   (d) $(-\infty, 0) \cup (0, \infty)$
   (e) None of the above
5. Which of the following functions is neither even nor odd?
   (a) $5 - x^2$
   (b) $2x + 7x^5$
   (c) $\sin x + 4x$
   (d) $\sin x + x^2$
   (e) $\cos x + 5$
6. The graph of $f(x) = \ln x$ is shifted 3 units upward and 2 units to the right. Which of the following is an equation of the new curve?
   (a) $y = \ln(x - 3) + 2$
   (b) $y = \ln(x + 3) - 2$
   (c) $y = \ln(x + 2) + 3$
   (d) $y = \ln(x - 2) + 3$
   (e) $y = \ln(x + 2) - 3$
7. $\lim\limits_{x \to 2} \dfrac{2x^2 - 5x + 2}{x^2 - x - 2} =$
   (a) 0
   (b) 1
   (c) 2
   (d) ∞
   (e) $-\infty$

8. Evaluate $\lim_{x \to 7} \dfrac{\sqrt{x+2}-3}{x-7}$.

   (a) 0

   (b) $\frac{1}{6}$

   (c) $\frac{1}{3}$

   (d) 1

   (e) ∞

9. The vertical and horizontal asymptotes for the function $f(x) = \dfrac{3-x^2}{x^2-9}$ are

   (a) $x = 3$, $x = -3$, $y = -1$

   (b) $x = 3$, $y = -1$

   (c) $x = -1$, $y = 3$, $y = -3$

   (d) $x = -1$, $y = -3$

   (e) $x = 3$, $x = -3$

10. Find the value of k for which the function $f(x) = \begin{cases} \dfrac{x-9}{\sqrt{x}-3} & x \neq 9 \\ k & x = 9 \end{cases}$ is continuous at $x = 9$:

    (a) 0

    (b) -3

    (c) 3

    (d) 9

    (e) 6

11. Which of the following intervals contains a root of $x^3 + x - 5 = 0$?

    (a) $[-2, -1]$

    (b) $[-1, 0]$

    (c) $[0, 1]$

    (d) $[1, 2]$

    (e) $[2, 3]$

12. A particle moves along a straight line with equation of motion $s(t) = \sqrt{t+1}$. Find its average velocity over the time interval $[0, 3]$.

    (a) $\frac{1}{3}$

    (b) $\frac{1}{\sqrt{3}}$

    (c) $\frac{14}{9}$

    (d) 1

    (e) $-\frac{1}{12}$

13. Rewrite the function as a sum where each term is a constant times a power of x: $(5x^2 + \frac{1}{2x^3} + \frac{3}{\sqrt[3]{x}})\sqrt[3]{x^7}$

    (a) $5x^{17/7} - \frac{1}{2}x^{18/7} + 3x^7$

    (b) $5x^{17/7} + \frac{1}{2}x^{-18/7} + 3x^{2/21}$

    (c) $5x^{13/3} + \frac{1}{2}x^{-2/3} + 3x^2$

    (d) $5x^{13/3} - \frac{1}{2}x^{2/3} + 3x^2$

    (e) None of the above

14. If $f(x) = (\sqrt[3]{x})^2$, then $\frac{df}{dx} =$

    (a) $\frac{2}{3}x^{5/3}$

    (b) $\frac{2}{3x^{1/3}}$

    (c) $\frac{2}{3x^{-1/3}}$

    (d) $\frac{3}{5}x^{5/3}$

    (e) $\frac{3}{2}\sqrt{x}$

15. If $f(x) = \pi^3 + \dfrac{x}{\sqrt{x}}$, then $f'(x) =$

(a) $3\pi^2 + \dfrac{1}{\frac{1}{2}x^{-1/2}}$

(b) $3\pi^2 + \dfrac{1}{2\sqrt{x}}$

(c) $\dfrac{1}{2\sqrt{x}}$

(d) $\dfrac{\sqrt{x} - x\frac{1}{2}x^{-1/2}}{(\sqrt{x})^2}$

(e) $3\pi^2 + \dfrac{\sqrt{x} - x\frac{1}{2}x^{-1/2}}{(\sqrt{x})^2}$

16. Find all values of x at which the tangent line to the curve $y = \dfrac{(x-3)^4}{x^2-2}$ is horizontal.

(a) $\sqrt{2}$, 3

(b) 0, 3

(c) -4, 1, 3

(d) $-\sqrt{2}$, $\sqrt{2}$

(e) -4, 0, 2

17. If a ball is given a push so that it has an initial velocity of 2 m/s down a certain inclined plane, then the distance it has rolled after t seconds is $s = 2t + t^2$. How long does it take for the velocity to reach 24 m/s?

(a) 2 seconds

(b) 4 seconds

(c) 5 seconds

(d) 11 seconds

(e) 12 seconds

18. Simplify the expression: $\dfrac{1 - \sin^2 x}{\cos x}(\sin x \tan x + \cos x)$

(a) 1

(b) $\sin x$

(c) $\cos x$

(d) $\tan x$

(e) None of the above

19. If $y = \cos(\cot x)$, then $\dfrac{dy}{dx} =$

    (a) $-\sin(\cot x)$

    (b) $-\sin(-\csc x \cot x)$

    (c) $-\sin x \cot x - \cos x \csc x \cot x$

    (d) $\dfrac{\cot x \cos x}{\sin x}$

    (e) $\dfrac{\sin(\cot x)}{\sin^2 x}$

20. If $F(x) = f(g(x))$, $f(1) = 0$, $f'(1) = 5$, $f'(2) = -4$, $g(1) = 2$, $g'(0) = -6$, and $g'(1) = 3$, then $F'(1) =$

    (a) -30

    (b) -24

    (c) -12

    (d) 0

    (e) 15

21. Evaluate $\lim\limits_{x \to \infty} \ln(x)$.

    (a) 0

    (b) 1

    (c) ∞

    (d) $-\infty$

    (e) Does not exist

22. If $f(x) = \dfrac{2^x}{\ln 2}$, find $f'(2)$.

    (a) 0

    (b) 1

    (c) 2

    (d) 4

    (e) 8

23. Find the inverse function of $f(x) = .5x - 2$
    (a) $f^{-1}(x) = 2x + 4$
    (b) $f^{-1}(x) = 2x - 4$
    (c) $f^{-1}(x) = 1 + 2x$
    (d) $f^{-1}(x) = 1 - 2x$
    (e) None of the above
24. Evaluate: $\tan^{-1}\left(\tan\left(\frac{7\pi}{10}\right)\right)$.
    (a) $\frac{-2\pi}{10}$
    (b) $\frac{2\pi}{10}$
    (c) $\frac{-7\pi}{10}$
    (d) $\frac{7\pi}{10}$
    (e) none of the above
25. What are the domain and range of $\cos^{-1}(x)$?
    (a) Domain: $[-\pi/2, \pi/2]$, Range: $[-1, 1]$.
    (b) Domain: $(-\pi/2, \pi/2)$, Range: $[-1, 1]$.
    (c) Domain: $[0, \pi]$, Range: $[-1, 1]$.
    (d) Domain: $[-1, 1]$, Range: $(-\pi/2, \pi/2)$.
    (e) Domain: $[-1, 1]$, Range: $[0, \pi]$.

Answers are posted on the course web page.