

Practice Final

Notes:

- This practice final and set Review (in WeBWorK) 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 blank scratch paper, a pencil, and an eraser. Scantron forms 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 $f(x) = \sqrt{\frac{1-x}{1+x}}$ 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 $f(x) = \frac{1}{x^2}$ 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. Jason leaves Detroit at 2:00 PM and drives at a constant speed west along I-96. He passes Ann Arbor, 40 mi from Detroit, at 2:50 PM. Express the distance (in miles) traveled in terms of the time (in hours) elapsed.
- (a) $d = 40(t - 2)$
 - (b) $d = 40t$
 - (c) $d = 1.25t$
 - (d) $d = 48t$
 - (e) $d = \frac{4t}{5}$
7. 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) $y = \ln(x + 2) - 3$

8. 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

9. $\lim_{x \rightarrow 2} \frac{2x^2 - 5x + 2}{x^2 - x - 2} =$

- (a) 0
- (b) 1
- (c) 2
- (d) ∞
- (e) $-\infty$

10. Evaluate $\lim_{x \rightarrow 7} \frac{\sqrt{x+2} - 3}{x - 7}$.

- (a) 0
- (b) $\frac{1}{6}$
- (c) $\frac{1}{3}$
- (d) 1
- (e) ∞

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

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

$x = 9$:

- (a) 0
- (b) -3
- (c) 3
- (d) 9
- (e) 6

13. 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) $[2, 3]$
14. 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) $-\frac{1}{12}$
15. Rewrite the function as a sum where each term is a constant times a power of x :
- $$\left(5x^2 + \frac{1}{2x^3} + \frac{3}{\sqrt[3]{x}}\right)\sqrt[3]{x^7}$$
- (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
16. 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) $\frac{3}{2}\sqrt{x}$

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

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

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

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

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

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

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

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

(b) $0, 3$

(c) $-4, 1, 3$

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

(e) $-4, 0, 2$

19. 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

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

(a) 1

(b) $\sin x$

(c) $\cos x$

(d) $\tan x$

(e) None of the above

21. If $y = \cos(\cot x)$, then $\frac{dy}{dx} =$
- (a) $-\sin(\cot x)$
 - (b) $-\sin(-\csc x \cot x)$
 - (c) $-\sin x \cot x - \cos x \csc x \cot x$
 - (d) $\frac{\cot x \cos x}{\sin x}$
 - (e) $\frac{\sin(\cot x)}{\sin^2 x}$
22. 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
23. Evaluate $\lim_{x \rightarrow -\infty} e^x$.
- (a) 0
 - (b) 1
 - (c) ∞
 - (d) $-\infty$
 - (e) Does not exist
24. If $f(x) = \frac{2^x}{\ln 2}$, find $f'(2)$.
- (a) 0
 - (b) 1
 - (c) 2
 - (d) 4
 - (e) 8
25. Solve $\log_4 x + \log_4 2 = 3$.
- (a) 16
 - (b) 24
 - (c) 32
 - (d) 62
 - (e) 66

Answers are posted on the course web page.