

Practice test 3

The actual exam will consist of 6 multiple choice questions and 6 regular problems.
You will have 50 minutes to complete the exam.

Multiple choice questions: circle the correct answer

- Solve for x : $\log_{\frac{1}{2}} x = 3$.
A. 6
B. $\frac{1}{6}$
C. 8
D. $\frac{1}{8}$
E. None of the above
- If $f(x) = x + \ln(x)$, find $f'(x)$.
A. $\frac{x+1}{x}$
B. $\frac{1}{x}$
C. $1 - \frac{1}{x}$
D. $\frac{x}{x+1}$
E. $\frac{x}{x-1}$
- If $f(x) = 4^{3x}$, find $f'(x)$.
A. 4^{3x}
B. $3 \cdot 4^{3x}$
C. 12^{3x}
D. $\ln(4)4^{3x}$
E. $3 \ln(4)4^{3x}$
- Find the inverse function of $f(x) = x - 2$.
A. $-x - 2$
B. $-x + 2$
C. $x - 2$
D. $x + 2$
E. $\frac{1}{x-2}$
- Find the inverse function of $f(x) = 3^x$.
A. -3^x
B. $\frac{1}{3^x}$
C. $\log_3 x$
D. $\log_x 3$
E. None of the above
- Simplify: $\frac{\ln 8}{\ln 2}$
A. 3
B. $\ln 3$
C. 4
D. $\ln 4$
E. $\ln 6$
- What is the domain of the function $\ln x$?
A. \mathbb{R}
B. $(0, +\infty)$
C. $[0, +\infty)$
D. $x \neq 0$
E. None of the above

Regular problems: show all your work

8. Find the inverse function of:

(a) $f(x) = 5x - 4$

(b) $f(x) = (x + 1)^3$

(c) $f(x) = e^x + 5$

9. Find a formula for the function whose graph is obtained from the graph of $f(x) = e^x - 1$ by

(a) Reflecting about the y -axis and then compressing horizontally by a factor of 2.

(b) Vertically compressing by a factor of 5 and then shifting 3 units to the left.

(c) Reflecting about the x -axis and then shifting 2 units down.

10. Evaluate the following expressions:

(a) $\frac{2^5 \sqrt{2^{20}}}{2^{18}}$

(b) $\log_2 32$

(c) $\log_5 \left(\frac{1}{125} \right)$

(d) $\log_4 \left(\frac{1}{2} \right)$

(e) $3^{\log_3 7}$

(f) $\log_6 2 + \log_6 3$

(g) $3 \log_8 4$

11. Solve the following equations:

(a) $\ln(5x - 2) = 3$

(b) $e^{3t+1} = 100$

(c) $\log_2 t + \log_2(t + 1) = 1$

(d) $10^{4x+1} = 300$

12. Differentiate the following functions:

(a) $f(x) = \left(\frac{1}{2}\right)^x$

(b) $f(x) = 5e^x - 8 \cdot 3^x + 9x^2$

(c) $f(x) = x^2 \ln x$

(d) $f(x) = \frac{\log_2 x - 2x}{2^x}$

(e) $f(x) = \ln(x^3 + e^x)$