# Practice Exam for Exam 3, Math 1111, Spring 2007

Print Your Name:

(1) No graphic calculator.
(2) In some problems you will need to circle more than one alternatives.
(3) Some problems are not multiple choice.

**1.** Find all vertical asymptotes of the rational function $f(x) = \frac{x+3}{x^2-9}$.

A) $x = 3$ B) $x = -3$ C) $y = 3$ D) $y = -3$ E) None of these

**2.** Find all vertical asymptotes of the rational function $f(x) = \frac{x+3}{x^2+9}$.

A) $x = 3$ B) $x = -3$ C) $y = 3$ D) $y = -3$ E) None of these

**3.** Find all horizontal asymptotes of the rational function $f(x) = \frac{x+3}{x^2-9}$.

A) $x = 0$ B) $x = 1$ C) $y = 0$ D) $y = 1$ E) None of these

**4.** Find all horizontal asymptotes of the rational function $f(x) = \frac{x^2+3}{x^2-9}$.

A) $x = 0$ B) $x = 1$ C) $y = 0$ D) $y = 1$ E) None of these

**5.** Find the domain of the rational function $f(x) = \frac{x+3}{x^2-9}$.

A) $(-\infty, \infty)$ B) $(-3, 3)$ C) $(-\infty, 3) \cup (3, \infty)$ D) $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$

**6.** Find the way one gets the graph of $y = \frac{2}{(x-1)^2+1}$ from the graph of $y = \frac{2}{x^2+1}$.

A) By moving up by 1 B) By moving down by 1 C) By moving to the right by 1
D) By moving to the left by 1 E) None of these.

**7.** Find the way one gets the graph of $y = \frac{2}{x^2+1} + 1$ from the graph of $y = \frac{2}{x^2+1}$.

A) By moving up by 1 B) By moving down by 1 C) By moving to the right by 1

D) By moving to the left by 1  E) None of these.

**8.** Let $y = f(x)$ be the function whose graph is that in problem 19 on page 384. Find $f(x)$.

A) $f(x) = 3^x$  B) $f(x) = -3^x$  C) $f(x) = 3^{-x}$  D) $f(x) = -3^{-x}$  E) $f(x) = 3^x - 1$

**9.** Let $y = g(x)$ be the function whose graph is that in problem 23 on page 384. Find $g(x)$.

A) $g(x) = 3^x$  B) $g(x) = -3^x$  C) $g(x) = 3^{-x}$  D) $g(x) = -3^{-x}$  E) $g(x) = 3^x - 1$

**10.** Let $y = h(x)$ be the function whose graph is that in problem 24 on page 384. Find $h(x)$.

A) $g(x) = 3^x$  B) $g(x) = -3^x$  C) $g(x) = 3^{-x}$  D) $g(x) = -3^{-x}$  E) $g(x) = 3^x - 1$

**11.** Let $y = f(x)$ be the function whose graph is that in problem 48 on page 397. Find $f(x)$.

A) $f(x) = \log_3 x$  B) $f(x) = -\log_3 x$  C) $f(x) = \log_3(-x)$
D) $f(x) = -\log_3(-x)$  E) $f(x) = 1 + \log_3 x$

**12.** Let $y = g(x)$ be the function whose graph is that in problem 50 on page 397. Find $g(x)$.

A) $g(x) = \log_3 x$  B) $g(x) = -\log_3 x$  C) $g(x) = \log_3(-x)$
D) $g(x) = \log_3(x-1)$  E) $g(x) = 2 + \log_3 x$

**13.** Let $y = h(x)$ be the function whose graph is that in problem 51 on page 398. Find $h(x)$.

A) $g(x) = \log_3 x$  B) $g(x) = -\log_3 x$  C) $g(x) = \log_3(-x)$
D) $g(x) = \log_3(x-1)$  E) $g(x) = 2 + \log_3 x$

**14.** Evaluate $\ln 1 + 2 \ln e^2$

A) 0  B) 2  C) 4  D) 6  E) None of these.

**15.** Find the equivalent exponential form of $3 = \log_b 64$

A) $b^3 = 64$  B) $3^b = 64$  C) $b^{64} = 3$  D) $64^3 = b$  E) None of these

**16.** Find the equivalent logarithmic form of $3^b = 64$

A) $b = \log_3 64$ B) $64 = \log_3 b$ C) $3 = \log_{64} b$ D) $b = \log_{64} 3$ E) $64 = \log_b 3$

**17.** Evaluate $\log 100 - 10^{\log 4}$.

A) $-2$ B) $-1$ C) $0$ D) $1$ E) $2$

**18.** Evaluate $\ln e^7 - e^{\ln 5}$.

A) $-2$ B) $-1$ C) $0$ D) $1$ E) $2$

**19.** Expand $\log_b\left(\frac{x}{y^2 z^5}\right)$.

A) $\log_b x + 2\log_b y - 5\log_b z$ B) $\log_b x - 2\log_b y - 5\log_b z$ C) $\log_b x - 2\log_b y + 5\log_b z$
D) $\log_b x + 2\log_b y - \frac{1}{5}\log_b z$ E) None of these.

**20.** Write $\frac{1}{2}\log x + 4\log(x-1)$ as a single logarithm.

A) $\log\left(\sqrt{x}(x-1)^4\right)$ B) $\log\left(\frac{1}{2}x + 4(x-1)\right)$ C) $\log\left(\frac{\sqrt{x}}{(x-1)^4}\right)$
D) $\frac{9}{2}\log\left(x(x-1)\right)$ E) None of these.

**21.** Find all solutions of $\log_2 x + \log_2(x-7) = 3$.

A) $8$ B) $-1$ C) $-8$ D) $1$ E) None of these.

**22.** Find the sum of the solution of $2^{3x-8} = 16$ and the solution of $27^{x+3} = 9^{x-1}$.

A) $-7$ B) $4$ C) $-11$ D) $7$ E) None of these.

**23.** Find all zeros of $f(x) = x^3 + x^2 - 5x - 2$. Show your work.

You need to provide some detailed work here and the zeros are $x = 2$, $x = \frac{-3+\sqrt{5}}{2}$, and $x = \frac{-3-\sqrt{5}}{2}$.

**24.** Solve $2^{2x} - 7 \cdot 2^x + 12 = 0$. Show your work.

You need to provide some detailed work here and the final answers are $x = \log_2 4$ and $x = \log_3 4$