MATH 220 (sections AL1, BL1, DL1, L1, L2, L3, L4) **Test 1** **Fall 2009**

1. (5 points) If the point $(3, -6)$ is on the graph of a one-to-one function f, then which one of the following points must be on the graph of f^{-1} ?

   (a) $(-6, 3)$

   (b) $(-6, -3)$

   (c) $(3, 6)$

   (d) $(-3, 6)$

   (e) $(-3, -6)$

   (f) $(6, 3)$

   (g) $(6, -3)$

2. (5 points) If the point $(3, -6)$ is on the graph of an odd function f, then which one of the following points must also be on the graph of f ?

   (a) $(-6, 3)$

   (b) $(-6, -3)$

   (c) $(3, 6)$

   (d) $(-3, 6)$

   (e) $(-3, -6)$

   (f) $(6, 3)$

   (g) $(6, -3)$

3. (5 points) If the point $(3, -6)$ is on the graph of an even function f, then which one of the following points must also be on the graph of f ?

   (a) $(-6, 3)$

   (b) $(-6, -3)$

   (c) $(3, 6)$

   (d) $(-3, 6)$

   (e) $(-3, -6)$

   (f) $(6, 3)$

   (g) $(6, -3)$

4. (5 points) What is the domain of the function $f(x) = \sqrt{x+9} + \sqrt{x+2}$?

(a) $(-\infty, -9]$

(b) $(-\infty, -2]$

(c) $(-\infty, 2]$

(d) $(-\infty, 9]$

(e) $(-\infty, \infty)$

(f) $[-9, \infty)$

(g) $[-2, \infty)$

(h) $[2, \infty)$

(i) $[9, \infty)$

(j) $[-9, -2]$

(k) $[2, 9]$

5. (5 points) Given that $7^t = 2$, what is the exact value of t ?

(a) $2/7$

(b) $7/2$

(c) $\ln(2/7)$

(d) $\ln(7/2)$

(e) $\dfrac{\ln 2}{\ln 7}$

(f) $\dfrac{\ln 7}{\ln 2}$

(g) $\dfrac{2}{\ln 7}$

(h) $\dfrac{7}{\ln 2}$

(i) $\dfrac{\ln 2}{7}$

(j) $\dfrac{\ln 7}{2}$

6. (8 points) Find a formula for $f^{-1}(x)$ given that $f(x) = \ln\left(\frac{x-8}{5}\right)$.

7. (8 points) Simplify the following expression.

$\sec\left(\tan^{-1}(3)\right)$

8. (8 points) Given that $f(x) = x^2 + 10$ and $g(x) = x^2 + 5$, find a formula for $(g \circ f)(x)$. You do not need to simplify your answer.

9. (8 points) Carefully sketch the graph of $f(x) = 10 - 2e^x$. Be sure to find the exact value of each horizontal and vertical intercept. The locations of any intercepts or asymptotes should be accurately shown on your graph.

10. (5 points each) Evaluate the following limits. When the limit is infinite be sure to state whether it is ∞ or $-\infty$.

(a) $\lim_{x \to 0} \dfrac{4x+1}{2-x}$

(b) $\lim_{x \to 2^+} \dfrac{4x+1}{2-x}$

(c) $\lim_{x \to \infty} \dfrac{4x+1}{2-x}$

(d) $\lim_{t\to\infty} \dfrac{\sin(4t)}{t}$

(e) $\lim_{x\to\infty} 5e^{1/x^2}$

(f) $\lim_{x\to 1^-} \dfrac{\sqrt{x}}{\ln x}$ (hint – it may help to think about the graph of $\ln x$)

(g) $\lim_{h \to 0} \dfrac{\sqrt{25+h}-5}{h}$

11. (8 points) What value of c makes the following function continuous on $(-\infty, \infty)$?

$$f(x) = \begin{cases} x^2 + 5 & \text{for} \quad x < 2 \\ 5x + c & \text{for} \quad x \geq 2 \end{cases}$$