21-111 Calculus I - Fall 2004

Diagnostic Test

August 30, 2004

Name:

Recitation Group:

There are 10 problems on this exam. Complete all problems, showing all work.

This Diagnostic Test does **not** count towards your final grade.

Problem	Score
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

1. Simplify

$$x(y + z) - z(x + y) + 2y(x - z) - 3(3y - 2z)$$

2. Simplify

   (a) $\frac{2+x^2}{2}$

   (b) $\dfrac{\frac{xy}{(x-y)}}{\frac{x^2}{y} \cdot \frac{y^3}{x}}$

3. Express as simply as you can

(a) $\frac{2}{5} - \frac{1}{2} + \frac{1}{3}$

(b) $\dfrac{\frac{1}{x} - \frac{x}{y}}{\frac{2y}{x} + \frac{2x}{y}} + \dfrac{x-y}{xyz}$

4. Simplify

(a) $\frac{1}{2^{-3}} - \frac{1}{2} + \frac{1}{5^{-2}}$

(b) $x^2 y^{-2} z^3 x^{-2} y^3 z^5$

(c) $(x^{-1} + y^{-1})^{-1}$

5. Simplify, if possible, assuming $a > 0$ and $b > 0$

    (a) $\sqrt{a^2 b^2}$

    (b) $\sqrt{a^2 + b^2}$

    (c) $\left(\frac{9a^8}{16b^4} \right)^{-\frac{1}{2}}$

6. Simplify, if possible,

   (a) $(-\infty, 5) \cap [3, \infty)$

   (b) $(-\infty, 5) \cup [3, \infty)$

   (c) $[3, 5] \cap (10, \infty)$

7. Complete the square of $x^2 - 6x + 15$.

8. Solve for x: $2y^2x - y^2 + (1 + 3y) = x$

9. Find all real solutions of $\sqrt{x} - 4 = 0$

10. Find all real solutions of $x^{\frac{2}{5}} - 3x^{\frac{1}{5}} + 2 = 0$

Extra space if needed