Name: ______________________________

Student Identification Number: ______________________________

TA's Name: ________________________

Calculus I
SKILLS TEST I
Practice Test

Directions: You have two hours to complete this test. READ ALL DIRECTIONS CAREFULLY! Partial credit will be given, but ONLY IF YOU SHOW YOUR WORK!

Unless otherwise specified, you may assume that each problem is worth 5 points. Please indicate ALL answers clearly by drawing a box around the final answer.

1. (2 points each) **TRUE OR FALSE:** For each of the following, indicate whether the statement is true or false.

   (a) ________ $\sqrt[3]{x^3} = |x|$
   (b) ________ $\ln\left(A^n + B\right) = n \ln A + \ln B$
   (c) ________ $\cos(2x) = 1 - 2\sin^2(x)$
   (d) ________ Any rational function has a domain of all real numbers.

   (e) ________ If $f(x)$ is a polynomial such that $f(a) = 0$, then $x - a$ is a factor of $f(x)$.

2. What is the **Domain** of $f(x) = tan(x)$.

3. What is the **Range** of the function $f(x) = x^2 - 4$.

4. Which of the following functions has a **Range** which is equal to its **Domain**?

   (a) $f(x) = \frac{1}{x^2}$
   (b) $f(x) = \sin x$
   (c) $f(x) = \frac{1}{x}$
   (d) $f(x) = 5$
   (e) None of the above

5. Do the lines given by the equations $7y + 3x - 17 = 0$ and $3y - 2x + 15 = 0$ ever intersect? If so, where? If not, why not?

6. Find the equation of the line whose x-intercept is 10 and whose y-intercept is 5.

7. Which of the following functions is **even**?

   (a) $f(x) = \sin x$
   (b) $f(x) = \dfrac{\sin^2(x)}{\cos(x)}$
   (c) $f(x) = \dfrac{1}{x}$
   (d) $f(x) = \ln(x^2 - 2)$
   (e) None of the above

8. (2 pts each) Given that $\ln A = f$, $\ln B = g$, and $\ln C = h$, evaluate the following expressions in terms of f, g, and h.

   (a) $\ln(ABC)$

   (b) $\ln((AB)^2)$

   (c) $\ln(\frac{1}{\sqrt{C}})$

9. If $f(g(x)) = (x^2 + 4x + 4) + 2x + 4$ and $g(x) = x + 2$, what is $f(x)$?

   (a) $f(x) = (x^2 + 4x + 4) + 2x + 2$
   (b) $f(x) = x^2 + 4$
   (c) $f(x) = x^2 + 2x$
   (d) $f(x) = (x + 2) + 2$
   (e) None of the above

10. If $h(x) = \sqrt{x}$, $k(x) = x^2$, and $l(x) = x + 1$, what composition of the functions h, k and l would give us $|x + 1|$?

11. Given the graph of **any** function $f(x)$, which of the following choices would produce a graph that is identical in shape to $f(x)$ but that is moved 2 units up and 2 units to the left?

   (a) $f(x) + 2$
   (b) $f(x) - 2$
   (c) $f(x + 2) + 2$
   (d) $f(x - 2) + 2$
   (e) None of the above

12. Find the following limits.

   (a) $\lim_{x \to 2} \dfrac{x^2 - 4}{x - 2}$

   (b) $\lim_{x \to 2} \dfrac{x^2 - 4}{x^2 + 8}$

   (c) $\lim_{x \to 0} \dfrac{\sin(x)}{\cos(x)}$

   (d) $\lim_{x \to 0} 12\pi$

13. Find all points where the graphs of the functions $f(x) = x^2 + 2$ and $g(x) = 2x + 1$ intersect.

14. (2 points each) From their general shapes match each of the following functions with one of the graphs. Write down the color of the correct graph.

The Basics:

(a) ________ $f(x) = x^3$

(b) ________ $f(x) = \sin(x)$

(c) ________ $f(x) = \dfrac{1}{x}$

(d) ________ $f(x) = |x|$