## First Midterm Exam

Name _____   Student ID Number _____

Section time and Instructor _____

You may use one sheet of notes. No other notes, books or calculators allowed. There are 10 questions, on front and back. Write answers on the exam and turn in only this paper. Show enough work so that we can see how you arrived at your answers.

1. Write a formula for the function whose graph is shown. Assume the lines continue to infinity outside the part of the graph shown here, and that their slopes are simple fractions.
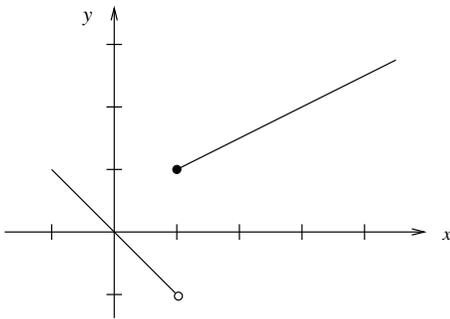
2. If $f(x) = 2x$, $g(x) = 1/x$, and $h(x) = x + 5$, find $f \circ g \circ h$.

3. Which of the following are 1-1 functions?
(a) $f(x) = x^3$, for all real numbers x
(b) $f(x) = x^4$, for all real numbers x
(c) $f(x) = x^3$, for $x \geq 0$
(d) $f(x) = x^4$, for $x \geq 0$

4. Find the inverse function of $f(x) = 3\sin(x + (\pi/4))$.

5. Simplify $16^{\log_2(x)}$.

6. Find the equations of the horizontal and vertical asymptotes to the graph of $f(x) = (x+1)(x+3)/((x+2)(x+4))$.

7. Evaluate the limit
$$\lim_{x \to 3} \frac{x-3}{\sqrt{x} - \sqrt{3}}.$$

8. Show that the equation $2^x = x + 3$ has a solution in the interval $2 < x < 3$.

9. Find the equation of the tangent line to the graph $y = 3x/(x+1)$ at the point $(2, 2)$.

10. Use the definition of derivative to evaluate $f'(x)$ for $f(x) = 1/x^2$, thereby verifying the power rule for $n = -2$.

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