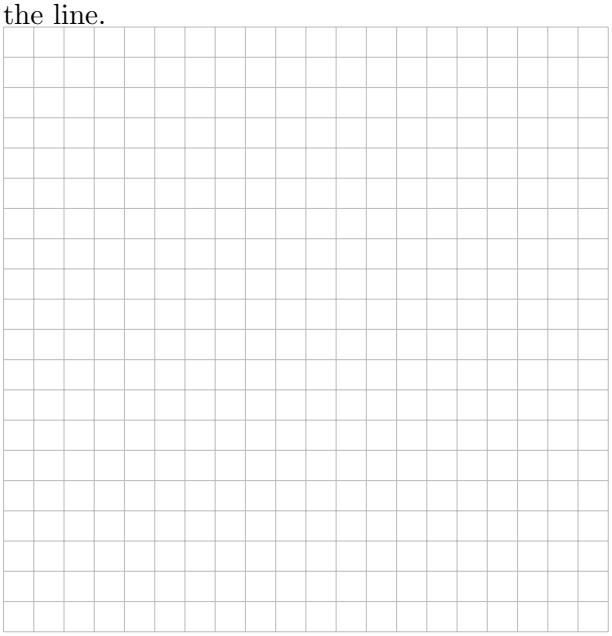
MATH 148 EXAM 1 9/21/11

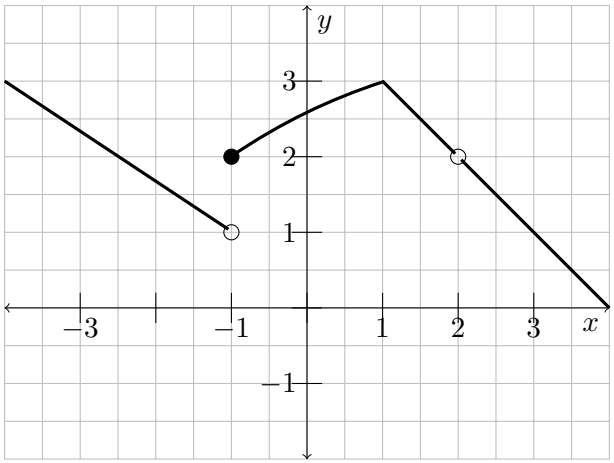
NAME:

INSTRUCTIONS: Show all your work. Even correct answers may receive little or no credit if the method of solution is not shown. Partial credit will be given for partially correct answers; if you cannot answer a question, just write down as much of the solution as you can. You may leave (quietly) once you have finished the exam. Calculators, notes, cell phones, and your friends' exams are all forbidden.

1. Let $f(x) = \sqrt{x^2 - 5}$ and $g(x) = \frac{12}{3x-2}$. Evaluate $(f \circ g)(2)$.

2. Find the equation of the line through the point $(-2, 0)$ with slope $\frac{2}{3}$ and sketch the graph of the line.





Graph of f for problems 3 and 4.

3. The graph of a function f is shown above. Use the graph to find the following limits when they exist.

a) $\lim_{x \to -1^-} f(x)$

b) $\lim_{x \to -1} f(x)$

c) $\lim_{x \to 1} f(x)$

d) $\lim_{x \to 2} f(x)$

4. Use the same graph to determine if the function is continuous for the following values of x.

a) $x = -1$

b) $x = 0$

c) $x = 1$

d) $x = 2$

5. Let $f(x) = \frac{1}{x-1}$ and $g(x) = \frac{x-1}{x}$. Find a formula for $(f \circ g)(x)$. Be sure to simplify your answer if possible.

6. Find the limit if it exists.

$$\lim_{x \to 2} \frac{x^2 - 4x + 4}{x - 2}$$

7. Find the limit if it exists.

$$\lim_{x \to -\infty} \frac{3x^3 + 13x - 10}{x^3 - 30}$$

8. Find the limit if it exists.

$$\lim_{x \to \infty} \frac{2x^2 - x + 4}{x^3 - 30}$$

9. Find the values of x for which the function $f(x) = \frac{x-1}{x+5}$ is continuous.

10. Find the slope of the tangent line to the graph of the function $f(x) = \frac{1}{x}$ at the point $(2, \frac{1}{2})$.

11. Find the derivative $f'(x)$ for the function $f(x) = 4 - 3x^2$.

12. The depth (in meters) of a Weddell seal t minutes after beginning a dive is approximated by the function $f(t) = -5t^2 + 40t$ for $0 \leq t \leq 8$.

a) What is the average diving speed of the seal over the time interval $[1, 3]$?

b) What is the instantaneous diving speed of the seal when $t = 1$?