Name: _____ **PID:** _____

TA: _____ **Sec. No:** _____ **Sec. Time:** _____

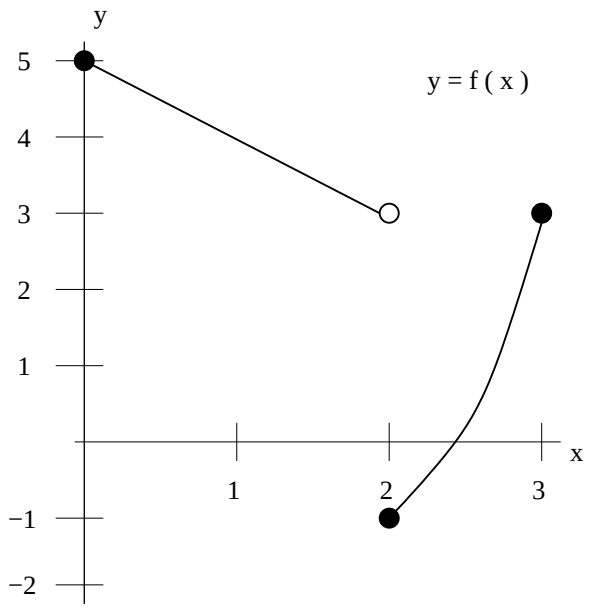
Math 10A.
Midterm Exam 1
October 19, 2010

Turn off and put away your cell phone.
You may use one page of notes, but no books or other assistance during this exam.
You may leave answers in symbolic form, for example $\sqrt{42}$ *or* $\ln(6)$.
Read each question carefully, and answer each question completely.
Show all of your work; no credit will be given for unsupported answers.
Write your solutions clearly and legibly; no credit will be given for illegible solutions.

If any question is not clear, ask for clarification.

#	Points	Score
1	6	
2	9	
3	9	
4	6	
Σ	30	

1. (6 points) Use the graph below to answer the following questions. Assume the entire graph is shown.



(a) What is the domain of f?

(b) What is the range of f?

(c) Find $f(2)$.

(d) Find $f^{-1}(4)$.

(e) Find $\lim_{x \to 2^-} f(x)$ or explain why the limit does not exist.

(f) Find $\lim_{x \to 2} f(x)$ or explain why the limit does not exist.

2. (9 points) Let $f(x) = 4\cos\left(\frac{x}{6}\right)$ and let $g(x) = 12e^{3x}$.

(a) What is the period of f?

(b) What is the range of f?

(c) Find a formula for $f(g(x))$.

(d) Find a formula for $g(f(x))$.

(e) The function g has an inverse. Find a formula for g^{-1}.

3. (9 points) Let $f(x) = \dfrac{x^2 - 1}{3x^3 - 6x^2}$.

(a) Find the equation(s) of the vertical asymptote(s) of f. Please show your work.

(b) Find the equation(s) of the horizontal asymptote(s) of f. Please show your work.

(c) Find $\lim_{x \to 1} f(x)$ or explain why the limit does not exist. Please show your work.

4. (6 points) For each part, find a formula for the indicated quantity:

   (a) The number of members in a club increases at a constant rate. Every four weeks, there are 20 new members. The club started with nine members. Find a formula for the number of members in the club x weeks after the club started.

   (b) Radioactive gallium-67 decays by 1.5% each hour. Suppose that you start with 200 grams of gallium-67. Find a formula for the amount of gallium-67 remaining after t hours.