

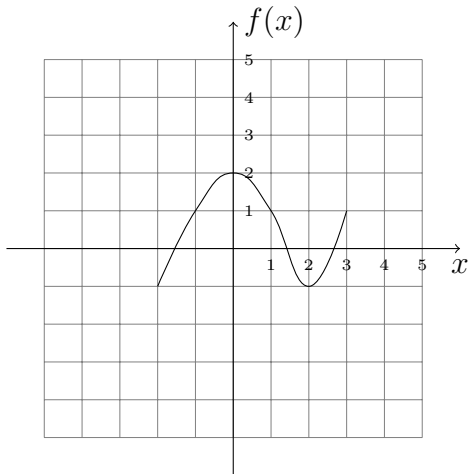
UC Berkeley
Department of Mathematics
Math 32– Midterm 1 Jeff Hicks

Name:

UID:

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- Please do not turn over this page until instructed to do so.
 - This exam contains 7 problems, of which we will score 6 problems. Indicate to us which 6 problems you would like us to grade by checking the small box at the top of the page. We will only grade 6 problems. Each problem is worth 10 points, for a total score of 60 points on this exam.
 - There are no notes or calculators allowed during the examination.
 - Should you finish during the last 15 minutes of the exam period, please remain seated *until we have collected all of the exams* as other students will still be working.
 - Solutions without work shown may not receive full credit. Box the solution you would like us to grade on each problem.
 - This exam contains 8 pages (including this page.)

1. Let $f(x)$ be the function whose graph is drawn below.

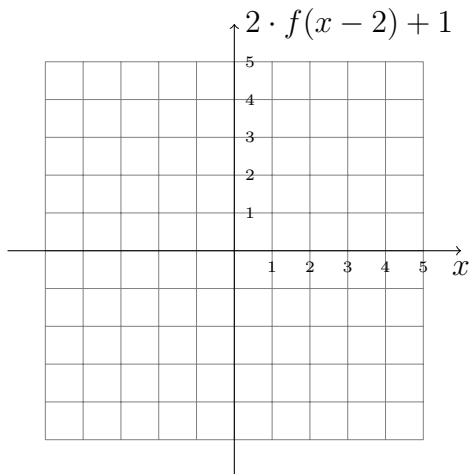


(a) (1 point) What is $f(3)$?

(b) (2 points) Explain whether or not the function $f(x)$ is one-to-one.

(a) (2 points) Describe the domain and range of f in interval form.

(c) (5 points) Draw the graph of the function $2 \cdot f(x - 2) + 1$ in the space below.



2. Consider the functions given by the tables below.

x	$f(x)$
1	1
2	3
3	4
4	5
5	2

x	$g(x)$
1	4
2	4
3	2
4	2
5	3

- (a) (1 point) What is $f(3)$?
- (b) (2 points) Compute $(f \cdot g)(5)$.
- (c) (3 points) Compute $(g \circ f)(3)$.
- (d) (4 points) Compute $(f^{-1} \circ g)(2)$.

3. (a) (5 points) Give the equation of a line containing the points $(4, 2)$ and $(2, 1)$.

(b) (3 points) Find the equation of a line which passes through the origin and is perpendicular to the line from Part (a).

(c) (2 points) Find the point of intersection between the lines from Parts (a) and (b).

4. (10 points) Describe the set of real numbers satisfying the inequality $|2x - 2| < x$ using interval notation.

5. Consider the function

$$f(x) = \frac{x + 1}{x - 1}$$

(a) (2 points) Write the domain of $f(x)$ using interval notation.

(b) (5 points) Write an equation for the function $f^{-1}(x)$.

(c) (3 points) Write down the domain and range of $f^{-1}(x)$ using interval notation.

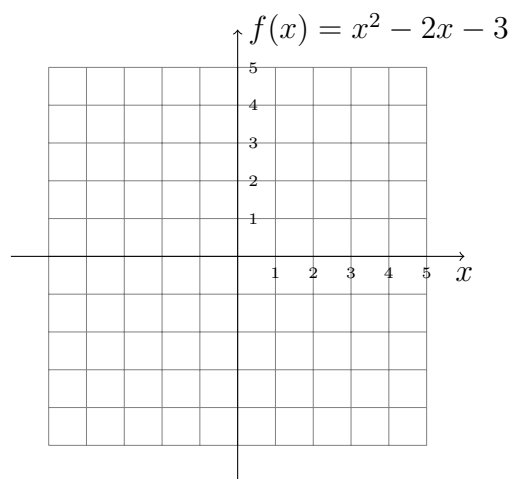
6. Consider the parabola given by the function

$$f(x) = x^2 - 2x - 3$$

(a) (2 points) Algebraically find the zeros of $f(x)$.

(b) (4 points) Algebraically find the vertex of $f(x)$.

(c) (4 points) Graph $f(x)$ below, and mark the zeros and vertex of the parabola.



7. (10 points) Find all points where the line $y = \frac{3}{4}x$ intersects the circle of radius 5 centered at the origin.