

Math 90 Practice Midterm I

§§2-A – 3-B (Ebersole), 1.1, 1.3 (Stewart), W1

DISCLAIMER. This collection of practice problems is *not* guaranteed to be identical, in length or content, to the actual exam. You may expect to see problems on the test that are not exactly like problems you have seen before.

On the actual exam you will have more room to work the problems. You will see directions similar to these:

1. Please read directions carefully. Raise your hand if you are not sure what a problem is asking.
2. *You must explain your work thoroughly and unambiguously to receive full credit, except on questions or parts of questions designated as **Multiple Choice**, **Fill-In**, or **Graphs**.*
3. **No calculators or notes are allowed on this exam.**
4. You have 50 minutes to complete your test, unless announced otherwise. Do not spend too long on any one problem. You do not have to do the problems in order. Do the easy ones first. Do not attempt the bonus question until you have completed the rest of the test. Before turning in your test, please make sure you have answered and double-checked all the questions.
5. If you need scratch paper, please raise your hand. You may not use your own paper. When you have finished your exam, please turn in any scratch paper you use.
6. Write your solutions in the space provided for each problem, or provide specific instructions as to where your work is to be found. *Make it clear what you want and don't want graded.* Your final answers should be boxed or circled.
7. Don't stress! I'm rooting for you!

Multiple Choice. *Circle the letter of the best answer.*

1. A description for the function $f(x) = \sqrt{3x} + 2$ is
 - (a) Take 3 times a number and then add 2
 - (b) Take 3 times a number, add 2, and then take the square root of the result
 - (c) Take 3 times a number, take the square root of the result, then add 2
 - (d) Take $\sqrt{3}$ times a number and then add 2
2. The range of the function $g(x) = -x^2 + 6x + 5$ is
 - (a) \mathbb{R} (all real numbers)
 - (b) $[14, \infty)$
 - (c) $[-\infty, 14)$
 - (d) $(-\infty, 14]$

3. The graph of the function $g(t) = \sqrt{9 - t^2}$ is
- (a) A circle of radius 9 centered at the origin
 - (b) A circle of radius 3 centered at the origin
 - (c) The upper half of a circle of radius 9 centered at the origin
 - (d) The upper half of a circle of radius 3 centered at the origin

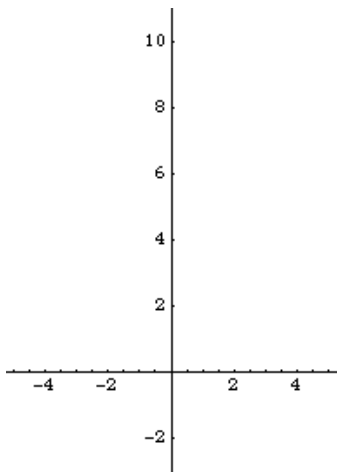
Fill-In. If $f(x) = 3x - 5$ and $g(x) = x^3$, then

1. $(g \circ f)(1) =$ _____
2. $(g - f)(0) =$ _____
3. $(f \circ f)(2) =$ _____
4. $(f \circ g)(-1) =$ _____

Graphs.

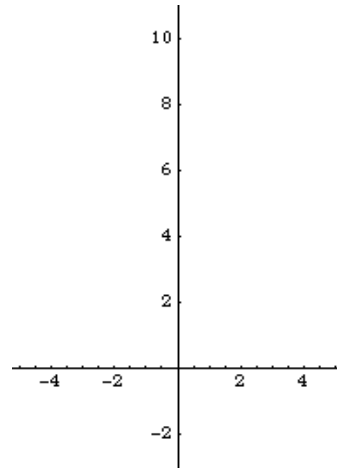
1. On the axes below, sketch the graph of

$$f(x) = \frac{2x^2 + 6x - 8}{x - 1}.$$

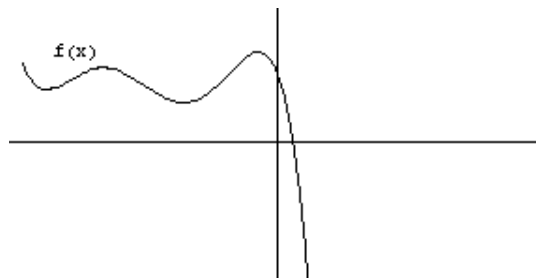


2. On the axes below, sketch the graph of

$$h(x) = 2|x - 1| + 3.$$



3. The graph of $f(x)$ is shown at right.
On the same axes, sketch the graph of $f(-x)$.



Work and Answer. *You must show all relevant work to receive full credit.*

1. Write $f(x) = \frac{|3x - 6|}{x - 2}$ as a piecewise function and graph the function. What is the domain of $f(x)$?

2. Let $f(x) = \sqrt{x + 1}$.

(a) Find the slope of the secant line to the graph of $f(x)$ from the point $(x, \sqrt{x + 1})$ to the point $(a, \sqrt{a + 1})$, where $x \neq a$. Simplify.

(b) Using your answer to part (2a), find the slopes of the secant lines

i. between the points $(1, \sqrt{2})$ and $(3, 2)$

ii. between the points $(-1, 0)$ and $(8, 3)$

iii. between the points $(-1, 0)$ and $(0, 1)$

Some kind of **BONUS**.