

MAT 1340

65 points

1.1 – Coordinate Plane

1.2 – Graphs in Two Variables

1.3 - Circles

Week 1 Written Assignment

Covers Sections 1.1 – 1.3

Be sure to follow [formatting guidelines](#) in your work.

Resources:

- Homework Videos on [harryzaims.com](https://harryzaims.com/public_html/121-online/Homework-Videos-and-Notes/): https://harryzaims.com/public_html/121-online/Homework-Videos-and-Notes/
- Use Classlist on the [Course Shell](#) to ask me questions in e-mail.
- Attend my [Office Hours in ZOOM](#) at 10 a.m.
- Call me at 970-290-0550 and I'll open up my office and we can meet any time, if you're in a hurry, and you missed the regular office hours. I enjoy a great deal of schedule flexibility, so this on-demand feature is something I can offer without much difficulty.

I have added some thoughts at the end of the assignment. It turned into a crappy essay, but I'm leaving it in. I would be pleased if you enjoyed or learned anything from "Grunt" and "Hand-In" discussion, but I think it may just be a case of my over-sharing my thought process.

"Write much. Think little." That's always been *my* mantra. It carried me over quite a few rough patches in my learning, where things didn't come to me as easily as they seemed to come to other people. Usually, I was fairly quick, but when I wasn't, I had to grind. I had to write a lot extra.

1. (5 pts) Graph the region corresponding to the system of inequalities:

$$y \geq 0$$

$$x > 1$$

$$2x + 3y \leq 6$$

Clearly indicate the x - and y - intercepts of all the boundaries of the regions corresponding to each inequality, as well as the coordinates of any corner points of the feasible region.

Use my "[Scratch out the Bad Stuff](#)" method that I describe in the Video for Section 1.1 #11. The WebAssign always wants the "good stuff" shaded. I disagree with WebAssign when it comes to rendering these things by hand on a tablet or a piece of paper. I'm afraid the video is imperfect, but it *does* show you the idea of how to handle a situation like this.

When you "scratch out the bad stuff," the "good stuff" leaps off the page, because it's the only area left on the graph that's still clean! As a weak artist, this method works much better for *me*.

As far as grading the thing goes, I don't care if you use WebAssign method or *my* method, so long as the intercepts all check out and you clearly indicate which part of the plane is "good stuff," in other words, which part of the plane contains (x, y) pairs that satisfy *all* of the inequalities in the system.

2. (5 pts) Find the distance between $(2, -3)$ and $(-7, 2)$.

3. (5 pts) Find the *exact* midpoint of $\left(\frac{\pi}{2}, \sqrt{3}\right)$ and $\left(\frac{\pi}{3}, -2\right)$ in lowest terms. Then approximate it to 4 decimal places.
4. (5 pts) Show that the triangle with vertices $(1, 2), (-5, 0), (-4, -3)$ is a right triangle, by using the converse of the Pythagorean Theorem. That is, reason from the fact that $a^2 + b^2 = c^2$ to the conclusion that the triangle thus defined must be a right triangle. This will require you to calculate 3 distances.
5. (5 pts) Graph $4x + 5y = 20$ by the intercept method.
6. (5 pts) Graph $y = 3x$ by using its intercept and any other point on its graph.
7. (5 pts) Graph $y = x^2 - 9$ by shifting the graph of $y = x^2$. Show and label its vertex.
BONUS: (2 pts) Find and label its x - and y -intercepts.
8. (5 pts) Graph $y = |x + 3| - 7$ by shifting the graph of $y = |x|$ in 2 steps. Show and label its vertex.
BONUS: (2 pts) Find and label its x - and y -intercepts.
9. (5 pts) Graph the $\frac{1}{2}$ -circle $y = -\sqrt{16 - x^2}$. Label its x - and y -intercepts.
10. (5 pts) Test the equation $y = x^3 - 9x$ for symmetry.
BONUS: (2 pts) Sketch the graph of the equation. Label its x - and y -intercepts.
11. The equation $x^2 + y^2 - 6x + 4y = 23$ represents a circle.
- (5 pts) Show that the equation represents a circle by rewriting it in standard form.
 - (5 pts) Graph the equation by labeling its center, North and South Poles, and the right and left endpoints of its equator.
BONUS: (2 pts) Find the x - and y -intercepts of the graph of the equation.
12. (5 pts) Find the area *outside* the circle $x^2 + y^2 = 16$ and *inside* the circle $x^2 + (y - 3)^2 = 49$. Sketch the region.

Grunt Pages and Hand-In Pages: A Soliloquy (Optional Read)

Back in the day, I had 2 manila folders for all my math classes. The first, and by far the thickest, was “Grunt.” The second, which I kept a lot nicer, was “Hand-In.” The “Grunt” was all the writing I did, to figure out the answer. “Hand-In,” as the name suggests, was the version I turned in to be graded. On that version, I wrote out the question as correctly and briefly as I could, and I wrote out the steps and showed all the support, including all the scratch I used, all in one place, and as organized for someone else to read as possible.

Because I wrote so darn much on everything, and learned to explain things to someone at or slightly below my level, I basically made the perfect study guide for myself, preparing for tests. I’d flip through both folders and make sure I knew how to do everything, and could make up (or for this class, just click on “Practice Another” in

any of your old WebAssign assignments) any version of it and confidently solve it, which meant that I also knew how to check my answer.

The tools are different, these days. You can check a lot of your work using technology, if you know how to use a website like Wolfram Alpha or Desmos Graphing Calculator, or you have a TI 83/84, which is kind of a standard graphing calculator. (By the way, if you do have a TI 83/84, there's a chapter in the back of the eBook that covers TI 83/84 techniques).

What I'm looking for, as an instructor, is a brief, yet complete narrative of the steps taken to solve the problem or answer the question.

You may use a pen tablet of some sort or a smartphone app, like CamScanner, to create high-quality PDFs of your written work.

Submit work as a single PDF file, of as many pages as it takes to do a good job. Don't try to save space or save paper. Learn this well, and you will go on to plant more trees than all the paper you could possibly cover with your hand-written notes.

If you use paper and pencil or pen, old-school, I would recommend a ream of cheap copier paper, 2 manila folders, a 3-ring punch, and a stapler. I stapled each section of homework together in my folders, back in the day.

If you're using a pen tablet, I think that's great. The analogue to what I used to do with manila folders can easily be replicated electronically on your device. The way I would do it would be to just save all my scribbles to Grunt in one document, and then save the latest version of Grunt to a version that lived in Hand-In. I think it's helpful to be able to see your failed attempts or rough drafts, all at a glance, when you're studying your nice, "Hand-In" version before Midterm and Final.