

Math 105: Calculus with Algebra
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Worksheet archive

Gradescope code: **B5J8EN**

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Gradescope Instructions for submitting work in Math 105

You will be using the online Gradescope program to submit your homework and exams. These instructions tell you how to sign up initially, and how to submit your written work.

Signing up for Gradescope the first time.

If you haven't used Gradescope for an **Amherst College** course before:

- Go to <http://www.gradescope.com>, click on "Sign up for free" (which may auto-scroll you to the bottom of the page), and select Sign up as [a] "Student".
- In the signup box:
 - Use the course entry code **B5J8EN**
 - Use your full name
 - Use your **Amherst College email** address. Or, if you are a Five-College student, use your email address from your own school.
 - Leave the "Student ID" entry blank.
- You will probably get an email asking to set a password for your account, so check your **amherst.edu** email inbox. (Or your email inbox through your own school, for Five-College students.)

Adding Math 105 to Gradescope.

If you **have** used Gradescope for an Amherst course before, and so you already have an account through your **amherst.edu** email, you still need to add Math 105, so:

- Go to <http://www.gradescope.com> and log in.
- Go to your Account Dashboard (click the Gradescope logo at upper left), and click "Add Course" at bottom right.
- Use the course code **B5J8EN**

(submission instructions on next page)

Submitting written work

First write it out on paper as you would normally. Then **scan it** to create a PDF. One method for scanning is the smartphone app **DropBox**. It makes nice clear scans, and it saves them directly into a folder so that you can have all your assignments in one place. **CamScanner** is another free scanning App, and there are others, too. **Gradescope** now has its own scanning app. You can also use a printer/scanner if you prefer.

Please be kind to our dear graders and make sure your submission is legible !

In particular, please leave some spacing between separate problems.

If you have a tablet computer, you may write your work there (instead of on paper) and save it as a PDF.

Some of you may know the math formatting package LaTeX and may want to use it in Math 105. That's fine, too; if so, you may write up your work in LaTeX and save the resulting PDF.

In short, any method is fine as long as it creates a legible PDF file and NOT a photo.

For example, if you use the DropBox app, then in your created *Math 105 Homework* Dropbox folder, you can select create (+) at the bottom of the screen and click the *Scan Document* option. Snap a shot of the first page of your homework, and then click [+] to snap shots of any subsequent pages. Do **not** use the *Take Photo* option.

After you have scanned/saved your work as a PDF, submit it on Gradescope as follows:

- Go to <http://www.gradescope.com> and log in.
- Select the course “Math 105, Fall 2026” and the appropriate assignment.
- Select “submit pdf” to submit your work in PDF format. Browse to find your PDF and upload.
- Now it is time to **tag** your problems. **This is an important step**, where you are telling Gradescope which problems are on which page(s).

For each problem, select the pages of your submission where your written solution appears.

I think the easiest thing to do is to click on the page of **your** homework upload where you wrote the given problem, and then click on the assigned problem listed. Repeat for each problem.

You must tag the problems or else you will not get credit for your work.

Gradescope will give you a warning when you go to submit your assignment if you have not selected the pages correctly. If you tag a problem incorrectly, you can fix it by clicking “More” and “Reselect Pages”.

- Click Save or Submit.

After your assignment is graded, you will be able to see your score on the written problems, along with comments, on Gradescope. You should receive an email notifying you when each homework set is graded.

Math 105, Fall 2026, Lab Worksheet 1

1. Simplify each of the following expressions. Show your work.

(a) $\frac{\left(\frac{a}{b}\right)}{\left(\frac{c}{d}\right)}$

(b) $\frac{1}{\left(\frac{a}{b}\right)}$

(c) $\frac{\left(\frac{a}{b}\right)}{c}$

(d) $\frac{a}{\left(\frac{b}{c}\right)}$

2. Solve each of the following equations (if possible):

(a) $x^2 - 4x - 21 = 0$

(b) $x^2 - x + 7 = 0$

(c) $x^2 + 2x - 4 = 0$

3. YES or NO: Does $\sqrt{x^2 + 4} = x + 2$? Why or why not?

4. Recall from class that we saw the graphs of $f(x) = \sqrt{x}$ and $g(x) = \frac{1}{x}$. Use these graphs to help you do the following:

(a) Sketch the graph of $F(x) = \sqrt{x+4}$. What are the Domain and Range of F , and why?

(b) Sketch the graph of $G(x) = \frac{1}{x-6}$. What are the Domain and Range of G , and why? Describe the output behavior of $G(x)$ as the input value x is near $x = 6$. (Be specific.) Briefly discuss the output behavior of $G(x)$ for x near $\pm\infty$.

5. The Absolute Value Function $f(x) = |x|$ is a *piecewise defined function* defined by

$$f(x) = |x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

(a) Give the Domain and Range for this function. Graph the absolute value function.

(b) Now consider $g(x) = |x - 6|$. Write out the piecewise defined definition of this function carefully. THEN use that definition to graph the function g . Briefly discuss how this graph relates to the graph of $f(x) = |x|$. Briefly discuss how this function behaves near $x = 6$.

(c) Now consider $h(x) = |x + 7|$. Write out the piecewise defined definition of this function carefully. THEN use that definition to graph the function h . Briefly discuss how this graph relates to the graph of $f(x) = |x|$. Briefly discuss how this function behaves near $x = -7$.

6. Let L be the line L that passes through the point $(3, -1)$ and is **perpendicular** to the line $2x + 5y = 6$.
- Find (and simplify) an equation for the line L .
 - Does L pass through the point $(1, -6)$? Why or why not?
7. Consider the function $f(x) = x^2 - 6x - 7$. Compute and **simplify** each of the following.
- $f(0)$
 - $f(-3)$
 - $f(1)$
 - For what values x does $f(x) = 0$?
 - $f(a)$
 - $f(a + h)$
 - $\frac{f(a + h) - f(a)}{h}$
 - CHALLENGE!!!** Compute $f(f(x))$. Show that it equals $x^4 - 12x^3 + 16x^2 + 120x + 84$. Yes... simplify! Come on you can try it...
8. Consider the function defined piecewise by

$$f(x) = \begin{cases} x + 2 & \text{if } x > 2 \\ -3 & \text{if } x = 2 \\ x^2 & \text{if } -1 < x < 2 \\ 5 & \text{if } x < -1 \end{cases}$$

Graph $f(x)$ and find its Domain.

9. Consider the function defined piecewise by

$$g(x) = \begin{cases} \frac{1}{x} & \text{if } x > 0 \\ -\frac{x}{2} + 1 & \text{if } -4 < x \leq 0 \\ x^2 & \text{if } x \leq -4 \end{cases}$$

Graph $g(x)$ and find its Domain.

Each person turn in your own solutions, using Gradescope, by 11:55pm tonight (Thursday).