

Welcome to Math 120!

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- Your job this week
 - Start homework!
 - Do welcome quiz
 - Go to quiz section tomorrow



Unnecessary jokes of the day

1. I asked my cat what is 2 minus 2...
he said nothing.
2. How I feel on the first day of a new quarter...



Pathway to Success

To Make Passing Likely

- 95% homework + studying for exams

Beyond Passing

- Practice effectively
- Productive struggle = real learning
- Hard in 10 weeks, but worth it
- Follow my tips & advice

Effective Practice

- Treat HW like exams!
- Review old exams often.
- Do timed practice tests.

Test Strategy

- Show all work for credit
- Learn to check arithmetic and answers.

Big Picture

- Exams test doing, not just knowing
- Grades matter less in this class, the tools you learn are what is important if you want to do well in Math 124

Even Bigger Picture

- College is a unique chance to explore, go find joy in learning new things.
- I run a YouTube channel for oddball, fun or general interest math things.
- Ask me anything, big or small—it might even inspire a video in your honor!

Chapter 1: Warming Up to Problem Solving

Goal: Unit Conversion and Rates

Example 1: You drive 60 miles in 2 hours.

(a) What is your average speed?

(b) How far would you go in 160 minutes?

(c) How long would it take to go 50 miles?

Chapter 1 Key Facts

- $\text{speed} = \frac{\text{dist}}{\text{time}}$
- $\text{rate} = \frac{\text{change in quantity}}{\text{change in time}}$
- Distance: 12 in = 1 ft, 3 ft = 1 yd, 5280 ft = 1 mi
100 cm = 1 m, 1000 m = 1 km
- Time: 60 s = 1 min, 60 min = 1 hr, 24 hr = 1 day

Example 2 (hw 1.3):

Olaf can walk 40 feet/min.

(a) How long will it take him to walk 2 miles?

(b) What is Olaf's "pace" in minutes per mile?

Unit Conversion and Rates

- Read carefully!
- Step 0 is to convert to matching units.
- Use the idea of "multiplying by 1", sometimes called "dimensional analysis".
- You can think of a constant rate like a conversion.

Example 3 (hw 1.12):

A waterpipe is leaking and creating a circular puddle. The area of the puddle is increasing at a constant rate of $5 \text{ cm}^2/\text{hr}$.

(c) Find the area after 90 minutes.

(d) Find the radius after 90 minutes.

Important Course Note:

- Build your notesheet as you do homework.
- Write down any formula you need to look up.
- If it's in homework, it may show up on an exam.

Some Formula That Pop Up in Ch 1 and 2

- area of a circle = πr^2
- volume of a sphere = $\frac{4}{3}\pi r^3$
- density = $\frac{\text{mass}}{\text{volume}}$
- quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- $a^2 + b^2 = c^2$

Example 4 (hw 1.2)

Sarah can bicycle a loop around a lake in 2 hours and 40 minutes.

If she increases her average speed by 1 km/hr, it will reduce her time around the loop by 7 min.

How many kilometers long is the loop?

Tip: “Given-and-Want” Problem Solving

0. Check units and convert!
1. Identify what we **want**
2. Identify what we are **given**
3. **Fact finding:**
 - Label Unknowns (very important);
 - Write related formulas
4. **Solve**, check units and reasonableness

Summary:

- Check units!
- $\text{speed} = \frac{\text{dist}}{\text{time}}$
- Start organizing your problem solving.

Try my “Given-and-Want” Method.

Advice: Effective Time Use on Homework

- Don’t get stuck too long (don’t email me that you’ve been stuck on a problem for an hour)
- If you can’t make progress on a problem after 5–10 minutes, label where you are stuck in your work, then move on.
- Then bring your questions to quiz section, office hours, or the discussion board.
- Start homework early so you can discover challenges well before the homework closing deadline.