Life of Fred

Pre-Algebra 2 with Economics

Stanley F. Schmidt, Ph.D.

Polka Dot Publishing

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About This Book

THE FONTS OF TYPE

There are three fonts that are used in the book.
The text of the book is written in this font. It is called Times New Roman.

When Fred is thinking, I will put his thoughts in this font.

When you, the reader, want to interject your thoughts, ***you express yourself in this font.*** Yes. You get to talk. You'll start two pages from now.

THE *Your Turn to Play*

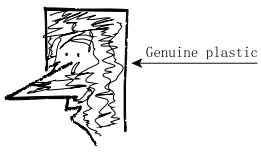
At the end of each chapter there is an opportunity to play with the ideas in that chapter. The questions are not the:

☹ 40 questions that are all alike
☹ drill-and-kill and
☹ boring questions
that you find in most math books.

I had fun writing the questions. In the first *Your Turn to Play* : "Let's play with the paint-mixing function. . . ." In a later *Your Turn to Play*, we look at how would you find something to eat if you were the only person on Earth.

In Chapter 26 we talk about opportunity cost. In the *Your Turn to Play*, you are to invent economic reasons involving opportunity costs for why you might turn down an $80/hour job at Terry's Taffy & Taco.

The complete solutions are provided right after the questions—all worked out in detail. Don't just read the questions and look at the answers. You won't learn much if you take that shortcut. Take out a piece of paper and write out your answers before you peek at mine. Put something over my answers if you are tempted to cheat. One reader suggested that I sell plastic Fred Heads to cover the answers.



THE BRIDGES

After every six or seven chapters, you will encounter **The Bridge**.

Small note to parents: The Life of Fred series is intended to be self-teaching. Learning how to learn by reading is an essential skill.

Your kids are old enough now. If you teach/tutor/help your kids, two things happen:
① They love it since they don't have to work so hard.
② They will not do as well in college because they won't have the practice of learning by reading.

Your opportunity to be involved is when they take their weekly Bridge exam. It's all explained right after Chapter 7.

After the last chapter in the book is **The Final Bridge**.

Of course, **The Bridges** are not just quizzes like the ones you might find in any other pre-algebra/economics book. You will learn a lot about Joe, Darlene and her mom. Even if you pass a **Bridge** on the first try, you will probably want to read (or even do!) the other tries.

CALCULATORS?

You've done the arithmetic part of your education. You know your addition and multiplication tables. If you can tell me instantly that seven times eight is equal to fifty-six, then feel free to use your calculator.

TYPOS AND ERRORS

I am human. My proofreaders are also. I've done every problem in this book twice. If you happen to spot an error, it would be a lovely gift to please let me know with an email to: lifeoffred@yahoo.com

As a thank you, I'll email you a list of all the corrections that other readers have reported.

ECONOMICS

Economics is only useful if there are other people around.

You will probably use your knowledge of economics much more than balancing chemical equations, computing inertia in physics, or counting your chromosomes in biology.

Economics is much more than shopping (despite the subliminal message on this page). Even life itself is about much more than shopping. (***Horrors! Nobody ever told me that!***)

You are going to learn a lot of important things in these pages:

➳ A sure-fire way to create 100% employment.
One simple law will do it.
➳ The difference between socialism and communism.
Most adults can't tell you the difference.
➳ The difference between freedom and liberty.
The word on our coins is "Liberty"—not "Freedom."
➳ The most surprising fact that *Each person in the world has a job that he or she can do at a comparative advantage to all other people.*
David Ricardo's Law of Comparative Advantage.
➳ The proof of Ricardo's Law of Comparative Advantage.
I know of no other economics book that proves this law.

And you'll also learn:

➳ How to do word problems, which is often the hardest part of beginning algebra.
➳ How to solve algebraic equations.
➳ How to run a successful hot dog business.
➳ What a real $100,000 bill looks like.

There is so much. Let's just get started.

Okay. I, your reader, am ready.

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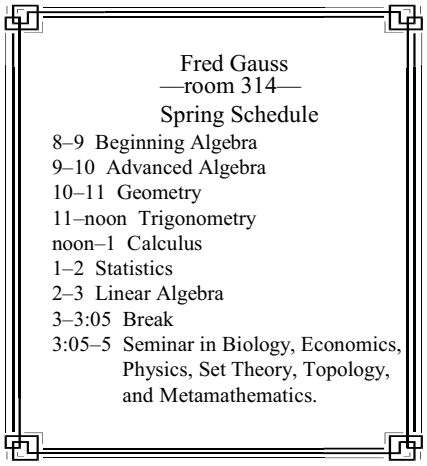
Chapter One
Summertime

Bittersweet.
The last day of the spring semester.
Fred had given his last final exam.
He had turned in the grades for his students.
He had picked up his monthly paycheck.
And all of endless summer lay ahead of him.

He walked back to his office in the warm Kansas sunshine thinking about the coming days. He stopped at his office door and took down his spring schedule.



Fred Gauss
—room 314—
Spring Schedule

8–9 Beginning Algebra
9–10 Advanced Algebra
10–11 Geometry
11–noon Trigonometry
noon–1 Calculus
1–2 Statistics
2–3 Linear Algebra
3–3:05 Break
3:05–5 Seminar in Biology, Economics, Physics, Set Theory, Topology, and Metamathematics.

There was now a nine-hour hole in his day that needed filling. He entered his office and put his grade book on a shelf with the other nine grade books.

Fred thought to himself: Ten semesters of teaching at KITTENS University. They have passed so quickly. Sometimes life seems so evanescent.*

✶ ev-a-NES-ent Like a vapor that grows less and less until it disappears. Although Fred is only five years old, he has read many good books and his large vocabulary reflects his wide reading.

Fred looked out his office window and saw his students heading off in a hundred directions. He sat at his desk and looked at the books on his desktop. He had bookmarks in a dozen books that he was reading. For several years now, he had been working on reading Dante's *Divine Comedy* in Italian (*Divina Commedia*). Besides learning Italian, he had the pleasure of reading poetry in its original language. Poetry often loses a lot in translation.

He loved reading history. On his desk was *Caesar's Gallic War* which begins with the famous words: Omnis Gallia est divisa in tres partes.*

Fred enjoyed biographies, science, math (of course), the sermons of Peter Marshall, books on the history of art, and all of the great literature of Western civilization listed in Clifton Fadiman's *The Lifetime Reading Plan* (third edition).

Today Fred turned to Christina Rossetti's poetry.** He opened the book at random and began to read "A Daughter of Eve":

A fool I was to sleep at noon . . .
Oh it was summer when I slept,
It's winter now I waken. . . .
No more to laugh, no more to sing,
I sit alone with sorrow.

Fred became a little teary-eyed. He shut the book. He could hear the hum of the vending machines in the hallway. He didn't know what to do with himself.

At least, Fred thought to himself, I don't have to worry about money. He took his paycheck out of his pocket and looked at it. For his nine hours of teaching each day, KITTENS University paid him $500 per month.

The KITTENS pay schedule is very simple. It is a function of how old you are. When Fred was three years old, they paid him $300 per

---

* "All Gaul is divided into three parts." Even though it wasn't poetry, Fred was reading it in the original Latin.

** She is often considered the most important woman poet in England before the twentieth century.

month. When he was four, his salary was $400 per month. Now that he was five, he was making $500 per month.

He pictured writing on a blackboard:

Let x = my age.
Then 100x = my monthly salary.
My salary is a function of my age.
You tell me my age, and I'll tell you my salary.

Then Fred realized that he wasn't teaching right now. He was alone in his office. The semester was over.

Intermission

The whole idea of **function** is wrapped up in the last sentence Fred wrote on his mental blackboard: *You tell me this, and I'll tell you that.*

★ If you tell me where you live, I can tell you your ZIP code.

★ If you tell me how old you are, I can tell you whether you are older than Fred.

★ If you tell me what paint colors you mixed together, I can tell you your final color.

Your Turn to Play

1. Let's play with the paint-mixing function.
   If you tell me red + blue, I will say purple.
   This could be written as red + blue → purple.

Now it's your turn.

   blue + yellow → ?
   black + white → ?
   red + white → ?

2. Do functions always involve numbers? Give a reason for your answer.

The Bridge

For those of you who have read *Life of Fred: Fractions*, *Life of Fred: Decimals and Percents*, or *Life of Fred: Pre-Algebra 1 with Biology* you can skip the rest of this page. You can take out a piece of paper and turn to the next page right now.

For the rest of you . . .

We are at **The Bridge**.

After every six or seven chapters, we give you the chance to show that you haven't forgotten what you have learned. **The Bridge** consists of ten questions from the beginning of the book up to the present moment.

It also gives you the chance to show that you actually worked the problems in the *Your Turn to Play*.

If you get 90% or more right, you have crossed the Bridge and have earned the right to go on to the next chapter. You are permitted to look back at earlier material in the book and use a calculator while you take this quiz.

After you have finished all ten problems, you and your parent (or guardian or teacher or jailer or superintendent or whoever is your supervisor) may compare your answers with those in the back of this book to see if you have crossed the Bridge.

Good luck.

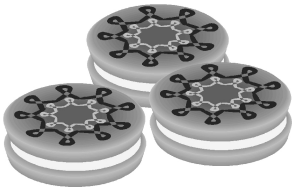
The Bridge

from Chapter 1 to Chapter 7

third try

1. Darlene wanted to go over to Joe's apartment and sit next to him while he watched his football game. She knew that he would like it if she brought over a snack for him to eat while he watched football.

She looked through her *Mastering the Art of Football Cooking* and found the perfect recipe: "End Zone Smashes."



Start with $\frac{1}{12}$ cup of cinnamon.

Darlene was stuck. She had the normal assortment of measuring cups:
1 cup, $\frac{1}{2}$ cup, $\frac{1}{3}$ cup, and $\frac{1}{4}$ cup, but no $\frac{1}{12}$ cup.

Darlene phoned her mother. Her mother was also watching football on television. During one of the commercial breaks she told Darlene, "Listen Little Lamby. All you gotta do is fill the $\frac{1}{3}$ cup with cinnamon and then pour that into the $\frac{1}{4}$ cup. What's left over in the $\frac{1}{3}$ cup is $\frac{1}{12}$ cup."

Was Darlene's mother right?

2. The next line of the End Zone Smashes recipe said:

Stir in $\frac{1}{6}$ cup of salt.

Without calling her mother, Darlene figured out how to do that.

How did she do it with her four measuring cups?

3. The cinnamon and salt mixture was how many cups? Remember the four General Rules for fractions, which were listed on the previous page.

4. The recipe continued: Then take a bag of marshmallows and discard the 15% of them that are not perfectly shaped. How many are left? (A bag of marshmallows has 160 marshmallows.)

The Bridge

from Chapter 1 to Chapter 7

5. The recipe continued: Take the remaining marshmallows, stir in the cinnamon-salt mixture and heat and stir until it is a gooey mess. Smear it between two cookies that you bought at the store, and you have End Zone Smashes that will delight anyone who watches football on television.

Darlene decided to test the Smashes on her mother before she took the rest of them over to Joe's.

She packed the 24 Smashes into a box. The whole thing weighed 78 ounces. The box itself weighed 18 ounces. How much did each Smash weigh?

6. Darlene knocked on her mom's door. (She lived next door.) Darlene had to wait until the next commercial break before her mother answered the door. Her mother said, "Hi, Little Lamby," and without another word they both headed back to the couch to watch the game. Over the next hour, Darlene ate 5 of the Smashes, and her mother ate 17 of them. What percent of the original two dozen Smashes were left for Joe?

7. Darlene's mother's cat ate the last two Smashes. Let the domain be the set of all 24 Smashes that Darlene made, and the codomain be the set {Darlene, her mom, her mom's cat}. Assign to each Smash the stomach it entered. Is this a function? Is it one-to-one?

8. The cat died. (At the autopsy the veterinarian said it died of a "stuck throat.") Neither Darlene nor her mom had stuck throats since they each had consumed a liter of Sluice. How many ounces are 2 liters of Sluice? (1 liter $\doteq$ 1.06 quarts and 1 quart = 32 ounces.)

9. Solve $2x = 9x - 119$

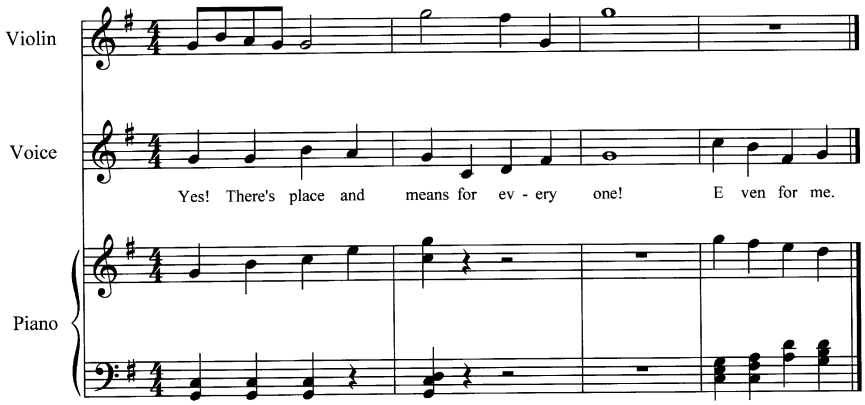
10. $\frac{1}{10} \times \frac{1}{100}$

Chapter Thirty-three
Dividing the Pudding

Fred took off his headphones and cleaned up everything. The words of Shakespeare were still going through his head: *There's place and means for every man alive.* In his head, he set those words to music:

Place and Means

Fred



Fred couldn't contain himself. He started to sing. In Sunday school he had learned that everyone has a place in God's heart, and David Ricardo had shown him that everyone has something to contribute in the economic world.

Sam Wistrom* came in and asked, "Is everything all right? I thought I heard someone in pain."

"It's okay, Mister Wistrom," Fred said. "I was just singing a happy song I made up."

"Well, you wouldn't feel so happy if you'd seen today's paper." Sam showed Fred the newspaper.

✶ Sam Wistrom is the janitor. His business card reads: Samuel P. Wistrom, Educational Facility Math Department Building, KITTENS University, Chief Inspector/Planner/Remediator for offices 225–324.

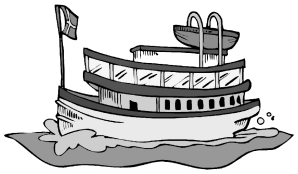
THE KITTEN Caboodle

The Official Campus Newspaper of KITTENS University Wednesday 10¢

exclusive

State Donates to KITTENS

KANSAS: The Kansas legislature announced today that it was giving KITTENS University its historic flagship, the Mirabelle Lou. This ship has a long history. It originally served as a supply ship in the War of 1812. It sat in dry dock until 1946, when it and 47 other ships were given away in the "Each State Gets One" program.



"Our university president declared today, "I am unsure . . .

(continued on p. 4)

Fate of the Mirabelle Lou Uncertain

The campus is in an uproar over the gift. Everyone is looking to our university president for guidance. The KITTEN Caboodle has asked various members of the university community for their reaction.

Sam, our custodian: "I guess I have to take care of it now."

Joe, student: "The Mirabelle Who?"

Alexander, graduate student: "It sounds like the results of another federal program."

FLASH UPDATE!

Minutes ago, our president announced that he was giving the Mirabelle Lou to the art department, the philosophy department, and the French department. It is to be shared equally by them.

DOUBLE FLASH UPDATE!!

Angry memos have been exchanged among the three departments regarding how they are going to share this gift.

"There's really no reason for those departments to fight about what they are going to do with the Mirabelle Lou," Fred said. "The courts have been dealing with this kind of situation for years. It's called a partition action. The court just appoints someone to sell the ship and divide the money equally among the parties."

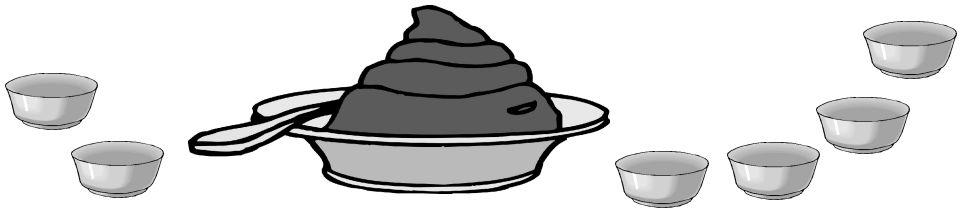
Sam thought about that for a moment and asked, "But what if there's nobody to sell to? I remember when my mother gave my brother and me a big piece of chocolate cake to share. She was smart enough not to cut the cake herself, because she knew that we would fight over who got the biggest piece. Instead, she had me cut the cake into two pieces, and my brother could choose which piece he wanted.

"I couldn't complain that my brother got the bigger piece, because I did the dividing. My brother couldn't complain, because he got to choose." Sam said goodnight and left Fred alone in the restroom.

Fred wasn't singing anymore. He thought to himself, That's a cool idea that Sam's Mom had: one kid cuts the cake, and the other one chooses. Neither one could complain.

Fred never had had any brothers or sisters, so he had never heard of that divide-the-desert-without-the-kids-complaining technique.

Fred imagined that someday he would get married and have six kids. He would make a big bowl of chocolate pudding and put it out on the table for his six kids to share. He would be smart, just like Sam's Mom, and not try to divide the pudding equally into six small bowls.



How to do it so that no one could complain?

☞ This is an economic question—"dividing the pie."
☞ This is a mathematics (logic) question.
☞ This is a practical question for anyone who has to arbitrate between conflicting parties.
☞ And this is a question that no other economics book (that we know of) talks about.

Some thoughts about the Pudding Problem . . .

#1: He wanted a method where the parents won't have to be involved.
#2: The method should involve only the big bowl, the six small bowls, and a spoon—no need for measuring cups, special scales, or other equipment.
#3: The method should be simple enough that a third-grader could understand it.
#4: There should be no way for some of the kids to act in collusion against the others. There should be no way, for example, for four of the kids to gang up against the other two and deny them their fair shares.

#5: The method must require that each kid say aloud, "I got a fair share." Then no one can complain.
#6: The number of kids should not be important. The method should work with two kids or twenty kids.

Is this possible? I'll have to give it some real thought. He turned off the light in the restroom and headed down the hallway toward his office.

That is a tough problem. Most adults don't know how to solve it. Let's do a little *Your Turn to Play* while we think about it. This *Your Turn to Play* will help you get ready for **The Final Bridge**, which is coming very soon.

Your Turn to Play

1. If the ship weighs 60 tons, how many kilograms is that? (One ton is approximately 907 kilograms.)
2. If the domain is the set {the Mirabelle Lou} and the codomain is the set consisting of the 27 departments at KITTENS University, and the university president assigns the Mirabelle Lou to the art department, the philosophy department, and the French department, is this a function?
3. One member of the French department found a treasure chest on the Mirabelle Lou. It contained $136 in silver coins and a whole bunch of gold coins that were each worth $52. Silver and gold coins were worth a total of $500. How many gold coins were there? Show your work, starting with Let x =. . . .
4. There were 230 rats on the ship. Twenty percent of them were gray. How many of them were *not* gray?
5. Express 83⅓% as a fraction.
6. $(\frac{7}{8})^2 = ?$
7. After the president announced that he was giving the Mirabelle Lou to the three departments, the art department started sending angry emails to the president at the rate of r emails per day. The philosophy department was sending angry emails to the president at the rate of r + 3 emails per day. In two days, they sent a total of 26 emails. What is the value of r?

.....COMPLETE SOLUTIONS .....

1. $\frac{60 \text{ tons}}{1} \times \frac{907 \text{ kilograms}}{1 \text{ ton}} = 54{,}420 \text{ kilograms}$

2. The definition of function is a rule that associates to each element of the domain *exactly one* element in the codomain. Since the Mirabelle Lou was assigned to three elements in the codomain, it is not a function.

3. Let x = the number of gold coins.

Then 52x = the value of those gold coins.

Then 52x + 136 = the value of the silver and gold coins in the chest.

$52x + 136 = 500$	
$52x = 364$	Subtract 136 from both sides
$x = 7$	Divide both sides by 52

There were 7 gold coins in the chest.

4. If 20% of the rats were gray, then 80% were not gray.

80% of 230 $0.8 \times 230 = 184$ 184 rats were not gray.

5. $83\frac{1}{3}\% = \frac{5}{6}$

6. $(\frac{7}{8})^2 = \frac{7}{8} \times \frac{7}{8} = \frac{49}{64}$

7. Let r = the number of angry emails sent by the art department each day.

Let r + 3 = the number of angry emails sent by the philosophy department each day.

Then 2r = the number of angry emails sent by the art department in 2 days.

Then 2(r + 3) = the number of angry emails sent by the philosophy department in 2 days.

Then 2r + 2(r + 3) = the number of angry emails sent by both departments in 2 days.

$2r + 2(r + 3) = 26$	
$2r + 2r + 6 = 26$	Distributive law
$4r + 6 = 26$	Combine like terms
$4r = 20$	Subtract 6 from both sides
$r = 5$	Divide both sides by 4

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