A Mathematics Playlet

By Members of the Mathematics Club
Our Lady of the Lake High School, San Antonio, Tex.

Costumes

Father Mathematics: (*Grandfather*): *An old man with a long, gray beard, wearing an ordinary suit. While on the stage, he dons a large black cloak and a wizard's hat, both decorated with mathematical symbols.*

Sally: *Usual attire of a high school girl.*

Mother: *Low-heeled shoes, hose, house dress, and apron.*

Nancy: *Sandals, short dress, a big ribbon in her hair.*

Artist: *Smock, tam, with palette and brush in his hand.*

Pupil: *In smock also, but with pencil and sketch pad in his hand.*

Hydrogen Twins: *Ordinary school attire, wearing a placard with large plus sign on it.*

Mary Oxygen: *Ordinary school attire, wearing a placard with a large negative sign on it. The back of her placard has "H_2O" in large black letters.*

Mike and John: *Trousers with one leg rolled up, scuffed shoes, shirt tails out, carrying toy guns.*

Pilot, Navigator, Waist Gunner, Bombardier: *No costume needed since they speak over loud speaker from off stage.*

Dancers: *Two dancers for "The Minuet" two for "El Jarabe Tapatio," and one for "The Chinese Sketch"—all in appropriate costumes.*

Miss Rhythm: *Wearing a short, white dress to which are pinned musical notes cut out of black paper, and carrying placards on which are written in large black numbers:*

$$3\ 8\ 4$$
$$8\ 8\ 4$$

Tulip Leaves: *Long, white dresses, with a large green crepe paper leaf pinned to the front of the dress; the leaves slant in opposite directions.*

Oak Leaf: *Person rounded out with pillows from shoulder to knees; pillows covered with white sheet; large oak leaf cut from green paper pinned to the front.*

Pill Bug: *In black jacket and long black pants.*

The Stem: *Long, white dress with a long, narrow stem made of green paper, pinned to the front of dress.*

The Tulip: *Wearing long white dress and crown made as a tulip flower.*

The "Pyramid": *Six girls in gym suits.*

Setting

Land of Mathematics. Stage is bare except for a desk and chair on the left and toward the front; another chair is toward the center and back. When Grandfather becomes Father Math, the stage becomes the land of Mathematics by the sudden appearance of solids as stage decorations. This is accomplished by pulling them onto the stage from the opposite wings. At the same time the decorations for the back wall are lowered into place. These are a large framed picture of da Vinci's "The Last Supper" and a large poster which reads: "Big Bargain! Bonds valued at $25.00 now $18.75. Hurry! Be one of the first!"

Sally is sitting at the desk, studying Algebra. Grandfather is reading the paper.

Sally: Oh, how I hate this. I wish I didn't have to study math. These factor problems are terrible!

Grandfather: Now, now, dear! What is the matter? Why math is a wonderful subject. I use it continually. I see it in everything about me—in electricity, in the radio, in my business. Why, math is an essential part of our life. Look, Sally, I've an idea. Let's go into the land of imagination and I will be—now, let's

see. (*Pause*) Oh, I'll call myself "Father Math," and you will be—just plain Sally. (*Dons black coat and wizard's hat, as he speaks. These are handed to him from off stage.*) And then as we travel, I'll show you the value of mathematics in everyday life. Since you will be taking Geometry next year, I want you to appreciate that subject as well as the Algebra you are now studying.

SALLY (*Disgustedly*): Oh, all right, grandpa,—as you say. (*They walk to the right side of stage.*

FATHER MATH: Which use of math would you like to see first?

SALLY: Well, what about seeing it in the home first?

FATHER MATH: All right, Look! (*Back curtain opens, showing mother busy about her baking.*)

NANCY (*entering from the left*): Mamma!

MOTHER: Yes?

NANCY: Can I have a cookie when you finish?

MOTHER: Yes, but run along now so I can finish. (*Nancy exits to left.*) Oh, dear! While she was talking I put in a tablespoon of baking powder instead of a teaspoonful. I guess I shall have to start again. Nancy! Nancy, do you have my $\frac{1}{8}$ measuring spoon? I need it very badly; I cannot go on unless I have it.

NANCY: Yes, mother.

MOTHER: Well, where is it?

NANCY (*enters, looking ashamed*): I was making mudpies and lost it. I don't see what you need with it anyhow. It's too little to do any good.

MOTHER: Now what shall I do? I can't go on baking then, because without it I can't get that accurate a measurement. I think I shall have to give up my baking attempts for today. (*Looks at watch*) It is so near lunch I won't have time to try again. I'll try some other time when I won't have to be a mathematical genius to bake cookies! (*Back curtain*)

FATHER MATH: Like it?

SALLY: Yes, grandpa—er, Father Math.

FATHER MATH: Now let us take a look at Mathematics as applied to art. (*Enter pupil and artist from the right wing and walk toward the left side, as the picture of "The Last Supper" is on the left side of the back curtain.*)

PUPIL: I don't understand why you have to bring up Math in art. It is so boring, and how could it have any connection with art?

ARTIST: Here, I will explain. Take this picture (*pointing*) of "The Last Supper" by da Vinci. The depth of the room is clearly conveyed, because da Vinci has drawn the walls on the left and right converging and not parallel; he did the ceiling and floor the same way. You should note, too, that if the lines of walls, floor, and ceiling were to be extended, they would all come together at the head of Our Lord, Who is the center of interest in this picture.

PUPIL: But what does that have to do with math?

ARTIST: Lots! You learn in Mathematics how to make something look deep when it isn't. If da Vinci had drawn the lines of the walls parallel, it would not look like a room; there would be no perspective, and Our Lord would not be the center of everything in the picture.

PUPIL: Oh, I see. In other words, geometry and art are related subjects. So even though I dislike geometry, it is still a wonderful thing. (*Exit artist and pupil to the left.*)

SALLY: I hope I'll like geometry next year.

FATHER MATH: Sally, I've been wondering. Do you take chemistry?

SALLY: Oh, yes, but please don't remind me of that!

FATHER MATH: Well, have you had any math in it yet?

SALLY: Yes, sorta.

FATHER MATH: I'll tell you what. Let's let someone in the land of imagination show you one important theory in chemistry —that like particles repel each other and unlike particles attract. (*Pause.*) Here come the Hydrogen Twins (*fighting*). I wonder what they're up to. Shhh! I see

Mary Oxygen too (*Enters*). Why, look at the twins run over to her. They stick together like—Hmmm! Why, look at that! H_2O! (*As Mary Oxygen enters, she takes her place between the Hydrogen Twins, and then smilingly reveals the back of her placard which says "H_2O." They then exit arm in arm.*) Did you see that, Sally? Did those "+'s" and "−'s" remind you of anything?

SALLY: Oh, yes! That was interesting. I am beginning to like math. What are we going to see next?

FATHER MATH: Oh, the business world! Surely, Sally, you can tell me about that.

SALLY: You mean bankers—and merchants—and—and—

FATHER MATH: Well, shall we say also statisticians, doctors, postmasters, government officials in internal revenue offices—just to mention a few others. Let's see one result of the banker's work—something of great value to us now.

(*Two little boys, Mike and John, stroll onto the stage from the left. One has a market basket; the other has a purse with money. The poster on the back curtain catches their attention.*)

MIKE: Say, John! Look at that. A bargain! Mother will like that.

JOHN: Ah, Mike, that gives me an idea. (*Then he whispers into Mike's ear. They open the purse and start counting the money.*)

MIKE: That's wonderful! Mother is going to like that. (*They run off the stage. After a short pause, they come back holding a bond.*)

MIKE: John, do-o—you—think—mother is going to mind?

JOHN: Heck, no. She's going to be proud of us.

MIKE: I hope you're right.

(*Enter mother from the right, sweeping.*)

TOGETHER Mother! Mother! We have a surprise for you.

MOTHER: Did you get my groceries? Did someone get hurt? Have you got the change? Well, tell us what happened?

TOGETHER: We—we bought you something.

MIKE: You know that big sign down the street? The one says: "Bargain." Well, look, mother. We got you a bond (*holding it up*).

MOTHER: You got me a bond? How? With what money?

JOHN: Well, mother, you see—we thought you wouldn't mind.

MOTHER: (*After a short pause.*) Well, boys, since you did it for our country and since it really is a bargain, I won't spank you, but mind you—(*They all three walk off, mother still talking.*)

SALLY: Gee, I didn't know even bonds were put on sales.

FATHER MATH: Well, not exactly! Let's say rather that it's compound interest that makes an $18.75 bond worth $25.00 in ten years. Can you figure that out?

SALLY: Who? me? You know better!

FATHER MATH: And now, Sally, I've a surprise for you. Oh, say, I hear a plane coming. Since we are in the land of imagination, let's suppose we were up there and you are the co-pilot of a B-17 (*Flying Fortress.*) I think the plane is headed for Germany—right for Berlin. You listen to the conversation between the crew members of the "Home, James." (*The members of the crew speak from off stage over a loud speaker.*)

PILOT: Pilot to navigator. Over.

NAVIGATOR: Navigator to pilot. Over.

PILOT: No trouble in sight, Mack, but request position, altitude, temperature, air-speed, ground speed, wind direction and velocity, and distance to target.

NAVIGATOR: Roger, *Wilco* (*Means will comply with the request.*)

PILOT: Roger.

NAVIGATOR: Navigator to pilot. Over.

PILOT: Pilot to navigator. Over.

NAVIGATOR: At our present altitude of 25,000′ the temperature is −20° Centigrade. We have a direct tail wind from 210° at 46 miles per hour. Our true

heading is 30° and with a zero degree drift correction our true course is also 30°. With our present ground speed of 271 miles per hour, we should be over Scheildkritz, Germany, in exactly four and one-half minutes.

PILOT: Roger. (*About ten seconds later*) Pilot to Right Waist Gunner! Focke-Wulf-190 coming in at three o'clock high. Watch him!

R. WAIST-GUNNER: Climb a little. I have him now. Come on in Nasty Nazis and join the party! (*Pause*) I got him! I got him! Chalk him up for the books. Don't see any others, do you?

PILOT: No! Must have been alone! They try that sometimes.

BOMBARDIER: Congratulations! Good shot, Eddie!

NAVIGATOR: Fine work, Ed. The drinks are on us—you really saved our lives.

PILOT: We are over Scheildkritz now. What's the score, Mack?

NAVIGATOR: From here to Berlin on our present heading is 63 miles. We will be there in fourteen minutes. This is the Initial Point (I.P.) of our bomb run. (*Pause*)

BOMBARDIER: Target sighted and identified. Bomb bay doors coming open. After bombs away we will turn to the right very sharply so that we can avoid the heavy "flak" section of Berlin.

BOMBARDIER: Bombardier to pilot—correct 5° right and hold course for 30 seconds. *Steady*! *Steady*! *Bombs away*!

SALLY (*after slight pause*): Oh, that was exciting! I want to know math so that I can perhaps some day be a pilot; it's always been one of my ambitions.

FATHER MATH: Sally, I'm sure you realize the part mathematics plays in the war, but a good many of the boys and girls going into service don't have enough math education, examiners tell us. Take, for example, the business arithmetic knowledge the men and women of the Quartermaster Corps and Troop Service Command must have so as to be able to deal with the supplies of food, clothing, housing equipment and ammunition, for the Post Exchange and Commissaries also carry on a great many business dealings. Another phase of the business mathematics field is the selling of bonds and stamps. The different people who have to handle the money and bonds must be competent from the kid who sells stamps to the paymaster giving out the pay to the Private 1st Class. Since the first days of the compass, plane geometry has been the biggest factor in guiding ships safely through the seas. Now also geometry and trigonometry guide men through the skies. But that's enough explanation. Now what would you like to see?

SALLY: Well, is there any math in music?

FATHER MATH: Now, suppose you tell me since you've taken music for two or three years.

SALLY: What do you mean? I have studied theory which tells us that there are certain number of beats to a measure. Sometimes there are dotted notes which add ½ the value to the note.

FATHER MATH: Is that all?

SALLY: Well, there are different time values; as, $\frac{2}{4}, \frac{3}{4}, \frac{4}{4}, \frac{6}{8}$, just to mention a few.

FATHER MATH: Yes, that's what I mean. Let's see that applied to dancing.

(*Miss Rhythm steps on from the left. She displays the placard which reads* $\frac{3}{4}$ *"4" during the "Minuet" and the other two placards during the respective dances. Each dance lasts only a minute or two and follows the preceding one in rapid succession.*)

SALLY (*dancing*): Oh, say, that was fun! Thank you.

FATHER MATH: Oh, you're welcome, Miss Sally (*slightly bowing*).

SALLY: I want to see more. Let's go! Let's go!

FATHER MATH: All right. Then let's take a peep at the outside world. (*In a puzzled voice*) What has that to offer in connection with mathematics? Oh, I hear a sound. Sh-h! We'll have to be very

quiet to hear the conversation. (*As the back curtain opens, the tulip leaves are seen talking to each other.*)

ONE LEAF: Have you noticed how big we are? Three inches long.

OAK LEAF (*stepping on*): Hmmmm! Why, that's nothing. I am five inches long and five wide—or better known as Mr. Five by Five.

PILL BUG (*crawling on*): But I can show you all up. (*Takes a big bite of the Oak Leaf and then rolls up.*) Look at the perfect circle I am!

THE STEM (*Strolls on*): Hey, what's going on here?

T. LEAVES: Stem, we have something to ask you.

THE STEM: Well, what is it?

O. LEAF: Do you have any math in you?

THE STEM: Why, sure. I am ½ inch in circumference and 14 inches long. See, I am a big stem. (*Pause*) Well, lookie here! Here comes the Tulip. She seems to have something to tell us about herself. (*Enter tulip.*)

THE TULIP: Indeed I do! Haven't you ever noticed all my lovely petals? They form a hexagon, since there are six of them. Just take a look at me. (*Struts. Meanwhile the tulip leaves take their places on each side of the stem. Oak leaf exits.*)

OTHERS: Beautiful! Come and join us. Won't you? (*She takes her place behind the stem, so that the picture of the flower is complete. Pause and then close back curtain.*)

SALLY: Oh, how I do love flowers, and now I can appreciate them even more.

FATHER MATH: Do you want to see more or would you rather go home?

SALLY: Well, what else is there?

FATHER MATH: Now's let's see. You've seen types of buildings and bridges. Even your home is a type of architecture. Let's look at some other forms of architecture. (*Back curtain opens enough to reveal an arch.*)

SALLY: Oh, look at that arch! Isn't it beautiful?

FATHER MATH: A masterful piece of work, indeed. But did you ever stop to think that math is used in even so simple a structure? Geometry has played a very important part in the construction of that lovely arch. Notice how balanced it is,—how one side is just like the other. Mathematicians call that symmetry. Now let's see just one more type of architecture—a kind we are all familiar with—the pyramid. (*Six girls in gym suits enter by way of the arch and form a pyramid. Sally shows her approval by clapping. Girls exit.*)

FATHER MATH: But now, Sally, we must really go! (*Starts to walk toward the center of stage.*) By the way, Sally, do you still hate mathematics?

SALLY: No, grandpa—er, Father Math. I'm ready to go back and finish that homework.

(*Enter all characters from right and left wings, forming a double semi-circle about Father Math and Sally, and sing:*)

Tune: Auld Lang Syne

Should all math'matics be forgot
And treasures that it hath?
Should all math'matics be forgot
And days with Father Math?
For Fath-er Math, my dear,
For Fath-er Math,
We'll think and learn and reason, yes,
For Fath-er Math.

CURTAIN

Notice!

On page 274 of the October issue of this journal the equation

$$ds = r\sqrt{1+\sin^2 u\left(\frac{dv}{du}\right)^2}\,du$$

should have been

$$ds = r\sqrt{1+\sin^2 u\left(\frac{dv}{du}\right)}\,du$$