The Cube

By Mauro Braunstein (braunst@fas.harvard.edu)
for Freshman Seminar 21n

Act I

Setting: Before time existed, in a dark room with a table. God, portrayed by a guy in a white robe with a flashlight inside it and some lightning bolts on a golden crown (he could wear one of those balls that has the lightning inside it that you can buy at Spencer's), sits across from Satan, portrayed by a beautiful woman wearing a red robe with a flashlight inside it and holding a red staff with three prongs.

God: I'm getting tired of this. This Big Bang thing has to happen soon or else we'll have no entropy, and we know you want that. What's wrong with this? *(God holds up a sketch of a circle.)*

Satan: What's wrong with it? It's too simple, that's what! Conics have all these simple geometric properties in addition to deep ones. Too good.

God: I suppose you're right. How about this. Algebraic, so that My creations think they can solve them and they're still beautiful. But what can we do with this?

Satan: *(Satan looks at her trident and gets an idea.)* Say, what about third degree? We'll create the cubic equation, and those loser creatures of Yours will try to find their rational points and have no end of trouble. We can make one of them look like the trident, in my honor.

God: Wait, wait. Who's God here, me or you?

Satan: Who's hotter?

God: Good point. OK, math will have cubic equations, but since you say you're so hot you get to live in Hell.

Satan: Hell? Hell, yeah!

God: So I call Heaven.

Satan: Fine.

God: Fine. Let there be light!

There is a huge flash of light as the Big Bang explodes; meanwhile, God and Satan exit and all becomes dark. While the Narrator speaks, lights slowly come back on over a country setting in Sumeria. The Sumerians are dressed simply, in brown robes and loincloths. On the grass is a chisel and a stack of pieces of clay with cuneiform writing.

Narrator: *(Out of nowhere)* And thus begins the long and fruitful story of the cubic equation. It began with the creation of the universe, as most stories should begin, and it will proceed to Sumeria, where humans first started messing with these –

Hami: *(Runs out screaming)*

Narrator: – equations. Except they weren't really equations. Turns out that Sumerians hadn't really developed a mathematical notation system, just a number notation system, so they made all these –

Hami: CRAZY TABLES!

Narrator: Yeah, those.

Hami: I CAN'T TAKE THIS! HOW COME I HAVE TO BE THE SCRIBE?

Hami's Mom: *(Enters)* Don't you worry, son; you're getting the best mathematical education possible.

Hami: But why do I need to know that $6^2 + 6 = 42$? And how come the solution to n –

Mom: No equations, dear. They haven't been invented, remember?

Hami: OK. I mean, think about the following question: What number gives you 41 when you add it to its square? Well, how come the answer the table gives doesn't work? I mean, it gives an answer CLOSE to 41, but not exactly. This isn't rational, mom; math is supposed to make sense!

Mom: It's the challenge, dear; why don't you try something more fun first?

Hami: Well, I'm a big fan of shapes. Shapes are sweet. Ever notice how you can draw four 90º angles with just two lines that cross each other? Seems like a triangle with one angle of that measure should be kinda fun to work with.

Mom: Yes, find something you like! Maybe you can even write a tablet!

Hami: A tablet! Mommy, that would be great! Wait, do you think Dean Hammurabi would let me skip core classes, like that silly Social Analysis 21, History of Polytheism class and that impossible Literature and Arts B 20, The Architecture of the Ziggurat?

Mom: (*laughs)* No, Hami! You have to take cores. Everyone has to take cores. Ur is all about being well-rounded.

Hami: Wait! This triangle here has sides 21 and 20, and the other side is 29! It's a whole number! How often does this work? And well-rounded? What if I put this triangle inside a circle? I think it'll fit neatly in only half of one! But I'm getting ahead of myself. (*Hami starts for the chisel and begins to compute.)*

Mom: Good job, Hami. Just find something you're happy doing. Say, it's awfully dusty out here. WASN'T IT YOUR DAY TO CLEAN THE LAWN?

Hami: N-n-no… *(Hami misses with the chisel and accidentally cuts his hand deeply.)*

The lights dim; the action is moved indoors, where Hami lies on the floor, muttering incoherently to his mother at his side. The hand he chiseled is now green; the ground is stained red with blood.

Mom: Noooooo! Don't die from an infection caused by a chisel going through your hand!

Hami: Ma ma ma. Moo, mo. Ma. Meh, meh, moh. Moooooooo! *(Dies.)*

Mom: NOOOOO!

Hami: *(Is dead.)*

Mom: O Gilgamesh, guardian of eternal life! (*Weeps.)* Watch over my son, the mathematician, and make sure the news of his Triangle is spread far and wide! And may it spark love of mathematics like it did in my son! Do this for me, Gilgamesh! Do it! Do it now! *(Weeps.)*

God: (*From above)* Fair request, I suppose. But Gilgamesh? Wrong guy. He's not even a god of your messed up polytheistic faith. We'll see what happens when your next-door neighbor Terah gets into a little altercation with his son, hm? Hee hee hee. Circles of lightning!

Satan: *(From below)* What in Hell do you think you're doing, Joe? Quit it with these circles. The sun is circular enough. π is easy enough. How about a

FRACTAL! *(Lightning strikes on Satan's scream, and after a flash of light, all is dark.)*

Narrator: It's too bad Hami died, isn't it? He was about to discover the Pythagorean Theorem, too. The next portion of our story takes us to Egypt, where some form of mathematics had to be developed in order for the Pyramids to be built. These guys were good; they could even compute the volumes of things approximately. Ahmes the Scribe is currently working on his masterpiece copy, which he calls "The Rhind." Let's see what he's up to.

Ahmes enters, wearing traditional Egyptian clothes and speaking in a fake Egyptian accent. The room is furnished with golden things, and a large sheet of papyrus lays open in front of him. He is whistling (and dancing to) "Walk Like an Egyptian."

Ahmes: Ah, Ra, my work is almost completed! I just need to fix one more – *(The lights suddenly go off.)* – WHAT HAPPENED? WHO TURNED OFF THE LIGHTS?

Moses: (*In the distance)* LET MY PEOPLE GO, SCHMUCK!

God: *(From above)* You go, Moishe!

Narrator: Well. Looks like we came at the wrong time. The Plagues are being unleashed. But take my word for it; these guys could do math. It's time we moved up a few years to Samos, in Greece, where our friend Pythagoras is schooling one of his pupils.

The scene opens in a simple stone room with a large tub of water; a man with a white robe is holding a man with a not-so-white robe and forcing his head under the water.

Pythagoras: HIPPASUS OF METAPONTUM! WHAT HAVE YOU DONE?

Hippasus: N-nothing, sir, nothing! I was, er, telling the truth?

Pythagoras: THERE ARE TWO THINGS WE DON'T TOLERATE HERE, HIPPASUS OF METAPONTUM, AND ONE OF THEM IS YOU.

Hippasus: O-only two?

Pythagoras: No, a few more. Three. The second one is telling the truth to people not in our inner circle. DO YOU UNDERSTAND ME, HIPPASUS OF METAPONTUM? DO YOU UNDERSTAND THE WORDS THAT ARE COMING OUT OF MY MOUTH, HIPPASUS OF METAPONTUM?

Hippasus: I'm sorry! I-I-I'm so-s-sorry! It's not my fault that twice the square of a number can't equal a square!

Pythagoras: MATH IS SUPPOSED TO MAKE SENSE! THIS ISN'T RATIONAL! THIS PROOF SHOULDN'T BE ALLOWED TO EXIST! I SHOULD GIVE YOUR BODY TO THE REST OF THE STUDENTS FOR DINNER TOMORROW! It's at least better than the stuff that Annenbergles prepares, right?

Hippasus: I thought we shouldn't eat meat, sir.

Pythagoras: Yeah, OK, four things we don't tolerate. *(Starts squeezing poor Hippasus on the stomach)*

Hippasus: You've given me three, sir; what's the fourth?

(Awkward silence. It is finally broken when Hippasus farts.)

Hippasus: I'm sorry, sir, I didn't mean to –

Pythagoras: BEANS! DIIIIIIIIIIE! *(Holds Hippasus's head underwater while Hippasus fruitlessly tries to break loose. After a while, when Hippasus stops kicking, Pythagoras gets up and exits.)* I'm going to open a window.

(Light fades, and when it comes back on, the scene is a temple with white stone pillars such that every rectangle is a golden rectangle. There is a cube in the middle of the room, and Satan, dressed as God stands on top of it. A priest enters, dressed in priestly robes and playing harmonic intervals on his lyre.)

Priest: *(To the tune of "A Tisket, A Tasket")* O Delos, O Delos, what wonders can you tell us?

Satan: What do you *(mimics God's deeper voice)*, I mean, what do you want to know?

Priest: *(To the tune of Michael Jackson's "Bad")* You know it's bad, it's bad, you know it! I say it's bad, it's bad, come on! Everyone's bad, it's bad, come on, you know! The people are all sick and dying and I can't do a thing about it, it's bad!

Satan: *(In her regular voice)* Hmm, people are dying! Delightful! *(Back to God's voice)* I mean, this is truly a cataclysm. But it can be fixed!

Priest: *(To the tune of "Look Down" from Les Mis)* O how? O how? Have mercy if you can! O how? O how? Please tell this pleading man!

Satan: See this altar on which I stand, one oracle, over – I mean, under God, indivisible, with liberty and justice for all? DOUBLE IT.

Priest: *(To the tune of the opening to Beethoven's 5th Symphony)* What shall I do? *(Pause.)* What must be done? *(Longer pause.)* Why don't I let the mathematicians figure out what this doubling of a cube is all about? What shall I do?

Chorus: *(Continuing the phrase)* What must be done?

Priest: What shall I do?

Chorus: What must be done?

All: To duplicate the cube? *(Priest holds the word "cube" longer than the rest and does oboe cadenza)*

Satan runs away from the cube during the priest's cadenza, cackling at his handiwork.

Priest: *(To the tune of "Stop in the name of love")* STOP! IN THE NAME OF MATH! Please tell me what to do! *(Cries, then slowly, to the tune of "I Think We're Alone Now")* I think I'm alone now… I need to figure out what it's all about. I think I'm alone now… I should go and find someone really smart! *(Exits, curtain falls.)*

Act II

Scene: the same dark room with God and Satan.

God: What did you do! *(Despairing.)* Simplicity is destroyed because of you and your stupid little trident! I should banish you from Heaven for that! Oh, wait, you're ALREADY banished from Heaven!

Satan: Yeah, yeah, it was necessary. We had to get around to giving them the cubic at some point. Wasn't that Delian priest a wacko?

God: *(Laughing)* Yeah, he was pretty messed up. His harp sounded nice comparatively, but he was still on the Pythagorean tuning. Dude, you have no idea how annoying it is to listen to EVERY PIECE OF MUSIC in C major for 1000 years. At least it's better than those Gregorian chants.

Satan: When can I introduce the cycloid?

God: Not now, not now. How about a game of Stratego to see where we'll improve next?

Satan: Stratego? Ha! Your marshall will be dead in five minutes flat. You know I'm the master.

God: I'm the master. I'm God, dude, and you're not.

Satan: True, true…

The scene fades as the narrator starts talking again out of nowhere. The new scene is India, where Bhaskara the Teacher is eating a bowl of rice inside a palace. Next to him is a pile of sunflower seeds, which he is apparently counting. His daughter Lilavati runs into the room in her beautiful pink wedding dress and pearl necklace. A water tub is set up with a small cup floating on it. All speak with fake Indian accents.

Narrator: Ah, here is Bhaskaracharya, the great Indian mathematician of Ujjain. His daughter is about to get married. Doesn't this sound fun? The year is about 1150 C. E. or so, and Brahmagupta has invented the zero and negative numbers already about 600 years before. Let's watch what these guys do.

Bhaskara: Ah, the fated hour is coming! Look at the water, Lilavati the Beautiful; when the cup falls, you shall get married!

Lilavati: Oh, Father, what a frabjous day! Calloo! Callay! *(Leans over; a pearl from her necklace falls into the tub, blocking the drain)* Oops.

Bhaskara: I was reading some of the work of Brahmagupta. Zeros and negative numbers are quite fascinating.

Lilavati: Oh, Father, I'm so excited!

Bhaskara: I'm glad you are enjoying mathematics so much! Let me tell you of some other things I've discovered.

Lilavati: Oh, Father, let's go! I'm like a filling bucket; I'm about to overflow!

Bhaskara: While counting these sunflower seeds I prepared for your wedding; I figured out how to approximate solutions to simple quadratics by taking square roots. Brahmagupta completed the square; now I'm developing numerical methods.

Lilavati: Oh, Father, hurry!

Bhaskara: Wow, you really do like math, don't you? I have a short algorithm for multiplication, and I really don't think division by zero is that great.

Lilavati: Oh, Father, the hour never comes!

Bhaskara: I also found the sum and difference formulas for sine. But most importantly, I tried solving the cubic but it didn't really work…

Lilavati: Father?

Bhaskara: Yes, O beautiful one with spacious eyes and amber waves of hair? Purple dresses, majestic, above the fruited chair?

Lilavati: Why isn't the cup sinking?

Bhaskara: *(Looks at watch, becomes VERY alarmed)* OH, NO! THE FATED HOUR HAS COME AND IT HAS GONE, BUT YOU ARE STILL NOT WED! Oh, what a cataclysm! This must be the work of the devil!

Satan: *(From below)* Hey, I didn't have anything to do with this!

Bhaskara: OK, Lilavati the amazing, you ain't weddin' nobody.

Lilavati: BUT FATHER!

Bhaskara: I'll name my math book after you. Now get out of that wedding dress and put on your normal clothes. If you keep crying, you ain't getting dessert.

Lilavati runs away crying. Bhaskara laughs to himself and continues counting seeds as the lights go out. The narrator begins to speak as the scene undims in Baghdad, in an observatory. Abu Ja'far Muhammad ibn Musa Al-Khwarizmi and his pal are talking, both dressed in normal Arab clothes for the time.

Narrator: Let's take a step back in time to Baghdad in 800 C. E. Abu Ja'far Muhammad ibn Musa Al-Khwarizmi is thinking about this new system of numbers from India, which was used by Bhaskaracharya many years later in the last scene. Al-Khwarizmi classified quadratic equations in terms of the signs of things since he didn't know about negative numbers yet.

Al-K: Let's see… Squares equal to roots, squares equal to numbers, roots equal to numbers, squares and roots equal to numbers, squares and numbers equal to roots, and roots and numbers equal to squares. That's all of them, I think.

Pal: Quite an exhaustive list. It would be better if there were only one.

Al-K: I'm the first person to try to classify these, all right? Give me some credit!

Pal: Do they even need…

Al-K: YES!

Pal: I think we should form a math team.

Al-K: A what?

Pal: A math team. We're really prolific writers of mathematics, right?

Al-K: Here in Baghdad?

Pal: Sure, there are other good mathematicians. We can name ourselves after the greatest mathematician of the 18^{th} century (which hasn't come yet), Leonhard Euler.

Al-K: We're not blind yet, and we don't have seven hundred kids.

Pal: It'll be fine. We can be the Baghdad Eulers. And fix your classification; there's NO WAY we need that many.

Narrator: *(As the scene fades)* Abu Ja'far Muhammad ibn Musa Al-Khwarizmi's friend was right all along, but his comment would have to wait a few centuries to Europe.

Scene changes. Leonardo of Pisa is talking to his dad Bonacci about his exciting trip to the Arabian peninsula. He's wearing Arab clothing and speaking in a fake Arab accent, while his dad is speaking with an Italian accent and dressed in European clothes.

Narrator: We turn now to Fibonacci, who has just returned from Arabia in 1200 C. E., where he learned of great works by Arab mathematicians – in particular, Omar Khayyam, who lived a hundred years before.

Leo: Abu! Abu!

Bonacci: Ah, my son, can you not speak Italiano?

Leo: No, Abu! I am obsessed with Arabic! And most importantly, I have discovered Arabic numerals, and they are SWEET, praise Allah! I will show them to all of Europe!

Bonacci: Easy, easy, son. Haste is bad.

Leo: This man Omar Khayyam has begun to solve the cubic equation! He solved it geometrically and hopes that an arithmetic method will be found!

Bonacci: Good job, son. Let's grab some pizza! Buon giorno!

Leo: Wait, Abu! I have a math competition in a few minutes! John de Palermo is giving me some problems to solve!

Bonacci: A competitzione? Good luck, Leonardo! Don't let the family down.

Leo: I promise I will keep the Bonacci name holy forever! I also discovered many interesting kinds of numbers! The congruum is a number that is both the difference of two squares and the sum of two squares!

Narrator: Ah, Leonardo, Leonardo Bigollo! What you have stumbled upon will be great! And your proofs that no congruum is square and that the difference of fourth powers is never a square will be a big help later, when Ferm… But I'm getting ahead of myself. Continue on.

Leo: And my sequence! Think about these rabbits, Abu…

Bonacci: My son, Fibonacci! The only rabbits I want are on my pizza! Let's eat, ah? Before the competition!

Enter Palermo, with a grim look and a list of problems, speaking like a mafia man.

Palermo: Not so fast.

Leo: Huh? It's time for evening prayers; what are you doing here?

Palermo: It's time for the PUTNAM Competition!

Leo: The what?

Palermo: The Palermo Ultimate Transcendental Numerical and Arithmetical Mathematics Competition! Solve $10x + 2x^2 + x^3 = 20$ NOW!

Leo: Tee hee!

Curtain falls. A large poster with the shape of the cubic curve is placed in the middle.

Act III

Same dark room, same God and Satan.

Satan: Time is nigh, my archenemy. Time is nigh.

God: Nigh to what?

Satan: People are puzzling over the solution to the cubic equation. Right now it is barely a star in the horizon; it's more like cosmic background radiation – say! Aren't you upset about Copernicus and those guys who keep saying that the Earth isn't in the center of the universe?

God: No. Why would I be upset?

Satan: God, it's so hot down there! Sure, Hell is exothermic, but all those heliocentrists give off a lot of body heat! And odor.

God: I'm glad you like it. And you still haven't told me to what time is nigh.

Satan: Oh, yeah. Time to give those dumb humans something to hold on to. They'll think it to be a crowning achievement, but in reality, it is just a ploy to give them more false hope! *(falsetto)* False ho-ope!

God: You know I don't like this. But this whole balance thing is wearing me out. I'm already sick because of the Inquisition and the Plague, so I guess I have no choice.

Satan: *(Attempts to hug God, who quickly backs away)* Thank you, Joe, thank you! You have no idea how much this means to me! Time to be cunning…

(Exits.)

God: Oy, vey. *(Proceeds to take a deck out of his pocket and play Solitaire, getting annoyed that the cards are always perfectly shuffled as the lights dim.*

An old man with a white beard sits at a table when the lights come back on. He is dressed simply like the Bolognese of his day, in a red tunic, with a learned air and a notebook.

Ferro: But ho! There is a knocking from without!

(The knocks play the first three beats of the Super Mario Bros. Theme.)

Ferro: Anon, anon! Come in! I wait for thee!

(The door opens, revealing a young man in a yellow tunic with bright blue hair and a tattoo of a scimitar on his cheek. The "man" is really Satan in disguise. A sudden diminished chord plays.)

Fior: *(In a villainous tone)* Ah, master, have you done it?

Ferro: No, Antonio, 'tis a taxing ordeal.

Fior: Why don't you try *(dramatic pause)* a variable substitution, master?

Ferro: It is a noble yet but fine suggestion
That thou, my student, thinked upon to-night;
Were roots and cubes astrangèd from thy grasp
Thou wouldst have seen it not, and no idea
Would come from this precocious talk of men.

Fior: Yes, yes, do you have it?

Ferro: Anon, anon! 'Tis not so fast at maths!

Fior: Good luck, master! Ha ha ha! *(As "he" walks toward the exit, "he" takes off his disguise and proves himself to be Satan and cackles softly.)*

Ferro: Roots and cubes equal to numbers, ho!

(Light goes off and then back on.)

Ferro: I found it! Antonio! Haste thee here anon!
My formulas and cosas have developed
Into a fine solution that will spin
Its way across the land and over sea.
But I do not want that! Secret must be!

(Knocks. The castanet intro to España Cañi this time.)

Ferro: Anon, anon! Come anon! Anon!

Fior: You have the solution?

Narrator: *(From above somewhere)* The venerable Scipione del Ferro is now telling his student Fior his darkest secret – in secret, of course. We know he'll also tell his son-in-law, but he doesn't want everyone to know of the Great Cubic. 'Tis a secret!

Ferro: Hast thou now understood this method grand
By which the Cube may gracefully be solved
Through the Cossick Art of Algebra?

Fior: Yes, yes.

Ferro: Thou keep ‘t and do guard thee it well! Anon!

Fior: Yes, yes. Anon, anon! Anon, anon! Dost thou ever shut thy iambic pentameter mouth? Anon thee! Why did thou not pay attention to the omens outside today? Cubes of fire fell from the clouds, elephants were eating each other in the streets, and the black man crowed!

Ferro: Why d –

Fior: Anon, anon! Anon! Anon, anon, anon! Anooooooooon! *(Takes out dagger)* Well, anon this, dork!

Ferro: Dost thou not –

Fior: SHUT UP! *(Puts dagger away.)* I suppose this is too bloody, anyway. Get thee here, old maaaster!

Ferro: What the –

Fior: *(Strangles Ferro)* There you go.

Ferro: Et tu, Fiore? *(Dies.)*

Fior: *(Removes disguise, talks as Satan normally)* Oh, woe. What have I done? *(Feigns extreme emotion)* WHAT HAVE I DONE? WAFNA! OH, HELL, WHAT HAVE I DONE? *(Back to normal)* Hee hee hee! *(Exits.)*

Scene fades; when it comes back, it is in a similar room in Italy but with a window and Venice outside. Tartaglia is inside, in a green tunic.

Narrator: We now turn to Tartaglia, who is *(pause)* a poor math teacher in Venice who *(pause)* speaks with a horrendous stumble – he is forced to speak in rhyme. He was hurt when he was a young boy. Sucks, doesn’t it?

Tartaglia: *(Always rhyming.)* This is great. A debate! I’ll beat Fior and settle the score!

Narrator: He’s got a *(pause)* debate in a few minutes with Fior, who is *(pause)* an evil but not very good mathematician. Tartaglia’s used to this debate

thing. He's very good at Lincoln-Douglas, especially, but he has some problems with Extemp. He often has to go home to prepare his answers. *(Narrator pauses for audience to laugh.)* Oh, look, here's Fior now. I wonder if he's ready!

Tartaglia: Fior, are you ready? I'll shred you into spaghetti!

Fior: Yes, yes. I have some *(dramatic pause)* cubic equations to give you.

Women: Not the cubic!

Men: No!

Women: Not the cubic!

Men: No!

Women: Not the cubic, not the cubic!

All: NO!

Tartaglia: What are you trying to do? Who won't succeed? You! A poor mathematician you are, and I will be known wide and far when I defeat you here today. You shall pay.

Fior: LET THE CONTEST –

Narrator: Pause! This will be fun to watch. Play!

Fior: BEGIN!

They write problems for a while, and the light goes off and on. At this point, they trade problem sets and go offstage in opposite directions to work. The Jeopardy! theme plays while various items, including a full bottle of ink, an empty bottle of ink, and a black cat which is understood not to have been black a short while ago, are thrown from Tartaglia. The following all happens offstage, with the two competitors on opposite sides.

Narrator: You're going to like this.

Tartaglia: I hate you, enough! These are tough!

Fior: I hate you more! I can't do any of these!

Tartaglia: Aha, I got it! *(Shoots an arrow at Fior.)* And I shot it!

Fior: I still can't do these problems.

Tartaglia: I'm neither stupid nor dumb. Yet you are only a crumb!

Fior: You can't do anything, either. Work!

Tartaglia: I solved the cubic just now! Wow!

Fior: Eep!

Tartaglia: In two hours, all your problems are done. I think I will now have some fun. Fior, what have you completed? Do you admit that you were defeated?

Narrator: Stop! Rewind!

Tartaglia: Do you admit that you were defeated? Fior, what have you completed? I think I will now have some fun. In two hours, all your problems are done.

Fior: Eep!

Tartaglia: Wow! I solved the cubic just now!

Narrator: Stop! In Spanglish!

Tartaglia: Eureka! Que rica! I solved the cubica! Chica!

Fior: Dios mio!

Tartaglia: In duas horas, I am finito. I el thinko I will comer uno Dorito. Fior, que comprendes? Agree that you perdendes?

Narrator: Stop! A third of the length.

Fior: This is really hard.

Tartaglia: Chill; take a pill.

Fior: I can't do it!

Tartaglia: I solved the cubic! It fills the rubric!

Fior: P!

Tartaglia: You didn't win. What a sin!

Narrator: Stop! Really, really short!

Tartaglia: I did it; admit it! You lost, get… *(Searches for word.)*

Narrator: BUZZ! Great job, guys. Time to move on; the story has just begun…

The scene changes to Cardano, in blue, and Ferrari, in red with a gold shield; on this shield there is a black horse and three stars.

Cardano: Yarrr! Tartaglia has a solution to the cubic! Yarrr!

Ferrari: Yeah, dude! Let's get it!

Cardano: Yarrr! I will write him letter after letter! And he will DIE UNDER MY CUTLASS! Yarrr!

Ferrari: He won't wanna give it, man. It's his secret. Why does everyone keep this stuff secret, anyways?

Cardano: Quiet! *(Takes out his cutlass.)* He WILL divulge it! Yarrr!

Ferrari: I like cars.

Cardano: My name begins with "Car"! Yarrr!

Both: *(Laugh.)*

Narrator: It took much convincing. Much, much convincing. Some promising and not keeping. But eventually, Tartaglia did give him the solution – in cipher AND in verse – and made him promise never to divulge it. But things were not to be as they would have been to be had they been to not have been!

Cardano: Yarrr! Ferrarrri, what do you say about pirating over to Bologna?

Ferrari: Cool, man! Can I drive the F-150?

Cardano: Yarrr! I guess!

The scene changes, but really, the only thing that changes is a sign that now says "Bologna." Della Nave, del Ferro's son-in-law, enters in a white tux.

Nave: *(Ghetto-ish.)* Yea! What do you want with da bomb-diggity della Nave, big Hannibal DN?

Cardano: We would like *(Short pause.)* the solution to the cubic. Yarrr!

Nave: Yea, I gots tons of dat, if yo' down what I be sayin'!

Cardano: Excellent! Yarrr!

Narrator: And so he published that in the Ars Magna, and Ferrari solved the quartic equation. He still had some problems with some cases involving imaginaries, but what, oh what can you do?

Cardano: Yarrr! We should teach that man Tartaglia a lesson!

Ferrari: Can I drive?

Cardano: Yarrr! If you must. Yarrr!

Same scene as last debate.

Tartaglia: I'm ready; I'm steady. Keep 'em coming; you'll be dead by morning!

Ferrari: 0 to 60 in 4 seconds flat, yo! You can't beat that in your stupid Corvette!

Tartaglia: Let's fight, a'ight?

They write, they trade.

Tartaglia: I'm bad! How sad!

Ferrari: Eat my dust, old stammering man! My F-150 just kicked you down!

Tartaglia: Your mother dislikes your brother! She's so fat that she sat on her cat! She has so little in her head that she's –

Ferrari: Dead. Run over by a pedestrian. Since then, I've been in love with cars.

Tartaglia: Whoa, there, I didn't know! Sorry that was so low.

Ferrari: You can't do your problems. You lose.

Tartaglia: How lame. SHAME! IN IGNOMINY I LEAVE THIS PLACE; MAY I NEVER AGAIN SHOW MY FACE! *(Exits.)*

Cardano: Good job! Yarrr! I will now predict the day of my death! Today! Yarrr! *(Slices his own neck with cutlass.)*

Narrator: And thus was the cubic solved. But much was left!

Act IV

Same dark room. God now sports a pair of glasses and a textbook, while Satan has a blue electronic gadget shaped somewhat like an hourglass. A line is drawn on the table.

God: The search for calculus is on, Satan.

Satan: Yes, yes, I know. Isn't it wonderful?

God: I'm glad you appreciate mathematical knowledge. Say, what is that blue electronic gadget shaped somewhat like an hourglass for?

Satan: Ah, God, I shall tell you later! It isn't ready yet.

God: What do you say of having two people discover this calculus thing simultaneously? Do you think it will be all right?

Satan: Tee hee! It will be all right, God; it will be quite all right!

Narrator: Calculus? *(The scene fades; Fermat and Pascal are sitting at an outdoor table in Paris; a tall tower with a face missing an eye looms in the distance.)* The time is ripe for Calculus, but such a discovery is not so simple. Many mathematicians have pondered it, from Archimedes to Zeno, thinking of the true nature of zero and infinity. Here we have Fermat, one of the inventors of the method of tangents to find maxima and minima. Mr. Derivative himself. And a coin.

Fermat: *(Flips coin.)* Heads. What is the probability of the next throw being heads, Blaise?

Pascal: According to my triangle, ½.

Fermat: *(Flips again.)* Heads. Again. And now?

Pascal: Still ½, Pierre. It's always ½.

Fermat: *(Flips.)* Heads. *(Flips.)* Heads. At this rate we'll never get tails. I win when we get tails.

Pascal: You have a ½ chance every time. Why not?

Fermat: *(Flips three more times, finding heads every time.)* This doesn't make much sense. Shouldn't I get tails sometimes?

Pascal: I suppose.

Fermat: *(Flips five more times, all heads.)* What about the next flip?

Pascal: ½ chance.

Fermat: *(Flips eight more times, all heads.)* And the next one?

Pascal: ½ chance.

Fermat: *(Continues flipping, always with heads.)* What happens when we die?

Pascal: ½ chance. Seems like it'll happen anyway, what's the use thinking about it?

Fermat: Well, I'm just wondering.

Pascal: Well, we go to Heaven.

(Silence for a few moments. Coin continues.)

Fermat: Are you sure?

Pascal: You can bet your life.

Fermat: But what if I lose?

Pascal: Then nothing happens.

(Silence. Coin continues.)

Fermat: *(Stops flipping, looks at coin to make sure both sides are not heads, and continues to flip.)* Nothing?

Pascal: Look, stop putting pressure on me. I don't know. I only think that we'll go to Heaven. If we believe that we'll go to Heaven and nothing happens, we won't know the difference, but if we believe nothing will happen and Heaven is there, then we'll be rejected from Heaven and go to Hell. So you can bet your life that you'll go to Heaven, because if you don't, then you lose.

Fermat: *(Flips.)* Tails.

Pascal: Stop flipping that ridiculous coin. Just sit still. I have discovered that all human evil comes from this: man's inability to sit still inside a room.

Fermat: We're outside.

Pascal: How low can you go?

Fermat: Well, that's not hard to find. We take where I am and subtract where I will be in a really short time, and then we divide by that really short time. We just figure out where that's zero, since it's the slope of the tangent line to where I am.

Pascal: That's not what I meant.

(Silence.)

Fermat: Look.

Pascal: What?

(Silence.)

Fermat: If I raise two to the power of two raised to a number, then add 1, I get a prime.

Pascal: Always?

Fermat: And even though the sum of two squares can be a square, the sum of two cubes can't be a cube, and the sum of two fourth powers can't be a fourth power, and so on.

Pascal: Is that so?

Fermat: Yes.

Pascal: Would you care to demonstrate?

Fermat: Sure. I have a wonderful proof.

(God enters.)

God: Hi.

Pascal: Who are you?

God: *(Aside.)* What an infidel! *(To Pascal.)* My name is Godot.

Fermat: I've waited too long. Where were we in our game? Figure out my probability of winning, and we'll split the money next week at Mersenne's. I have to go work for Satan.

God: Satan?

Fermat: I'm a lawyer. Bye!

Pascal: And the proof?

Fermat: It's too long. I'll tell you later.

(Fermat exits. Pascal and God follow. Scene fades.)

Narrator: What a jerk. He was probably lying, anyway. But his friend Pascal did invent a calculating machine that could add and subtract. But someone else invented one that could also multiply and divide…

England. Leibniz in dark red presents his machine to the Royal Society; many are present.

Leibniz: Look! It multiplies and divides! Well, it will, I haven't finished building it.

Hooke: Well, coil me down and spring me up! It doesn't do anything!

Leibniz: Don't worry, it will. Look at all the cool things I've discovered about series! I even talked to Varignon about plugging x = 1 into the power series for $\frac{1}{x+1}$!

Pell: Mouton has accomplished the same results. Look in his book tomorrow.

Messenger: Gottfried, your Elector of Mainz died!

Leibniz: This is a failure. I'll be back in Mainz in a jiffy… *(Exits.)*

Hooke: This guy sucks. If he comes back, I'll pull on him with a force proportional to my distance from equilibrium.

Pell: Don't be so harsh. Let's elect him to the Royal Society.

Oldenburg: *(Randomly comes in.)* Let's.

Leibniz: *(Runs in.)* Yay! *(Runs out.)*

Narrator: At this point, in 1673, Newton had already developed much of his Calculus of Fluxions but hadn't told Leibniz about it.

(Scene fades. Voices are heard above.)

Newton: Here, Leibniz, are some of my results.

Narrator: Time passes.

Leibniz: Ah, interesting results. Here's a reply.

Newton: He took so long to finish writing me! I think I'm going to cry. No, I'm not going to do that. I'm going to write him instead. Leibniz, I'm being polite, but you stole all my methods.

Leibniz: No, not really. Here's a fuller account of what I did, including the chain rule.

Newton: Bah… Not a single previously unsolved problem was solved.

Leibniz: But the formalism is better.

Newton: We'll see about that!

Leibniz: *(Publishes.)* You are a base man. Why the immaturity?

Newton: I HATE YOU! YOU PUBLISHED FIRST! PLAGIARIZER! I'LL HAVE YOU AD BOARDED FOR THIS, YOU ACID SWINE!

(Gunshots and sword fights are heard.)

Newton: I guess that means that I need to write things, too.

The lights come on to reveal a stunningly beautiful room, simply decorated but with bright white sunlight at some spots and bright rainbows in others. A harp plays arpeggios in the background, all of which contain those sevenths and ninths that we know make a harmony sound divine. There is a general sense of peace as the harp strikes a major chord and the strings play wide octaves on that root.

Newton: AAAAAAAAAAAAAH! *(Runs into the room and into a wall.)* Ow. *(Peace breaks.)* That hurt. I suppose that the wall hurt me as much as I hurt it, though, in terms of force… For every action, then, there is an equal and opposite reaction. And I wouldn't have stopped if the wall hadn't been there… I suppose that an object in motion tends to stay in motion unless something else acts on it.

Satan: *(Appears, in a puff of smoke.)* Ah, Isaac, Isaac! You should be thanking God that you're alive. Your father would surely have killed you back there…

Newton: What are you talking about? Who are you?

Satan: Please allow me to introduce myself. I'm a woman of wealth and fame. I've been around for a long, long year; stole many a man's soul and faith. Pleased to meet you! Hope you guess my name!

Newton: Who-hoo!

Satan: Because what's puzzling you is the nature of my game.

Newton: Hey, you! Get off of my cloud!

Satan: Oh, I'm shattered!

Newton: If I could stick my hand in your heart…

Satan: You can't always get what you want.

Newton: Yeah, I can't get no satisfaction… What is it that you want with me, anyway?

Satan: Oh, yes, yes. As you may know, in the other world I'm a big proponent of certain kinds of curves…

Newton: Other world?

Satan: Cubic curves. Nobody's working on them right now, after a big stagnant period after they solved the cubic equation.

Newton: What do you want me to do? Who are you?

Satan: Just enumerate third-order curves.

Newton: That's easier said than done.

Satan: *(Disappears in a puff of smoke.)*

Newton: Wait, where did you go? AHHH! YOU DISAPPEARED! COME BACK!

Satan: *(Appears in a puff of smoke.)* Have some sympathy, will you? I'm a busy woman. What do you want now?

Newton: Do you know… Do you know what light is made of?

Satan: Particles. But they behave like waves sometimes. Good day. *(Disappears in a puff of smoke.)*

Newton: Third order curves… A curve is of third order if a line can intersect it three times… I wonder in how many species I can divide this.

Narrator: Seventy-two. Rather, Newton can do seventy-two, but there are actually six more that he misses.

Newton: Well, a cubic always has at least one real point at infinity. Let's take the asymptote to this point, the tangent at infinity. It intersects the curve with multiplicity at least two, since it's tangent. So we have four cases, depending on whether this asymptote is at infinity or not and whether the third point is infinite or not. And these break into a bunch of other species, for a total of 72.

Narrator: 78.

Newton: Ha, look at the second type, $xy = ax^3 + bx^2 + cx + d$. In the nondegenerate case, it looks like a trident! Wow, it's just like that woman's! What a coinkidink! Even though Descartes did have it before, it's cool! And $xy^2 + hy = ax^3 + bx^2 + cx + d$ is really difficult… $y = ax^3 + bx^2 + cx + d$ is pretty easy. But this… This is interesting… $y^2 = ax^3 + bx^2 + cx + d$ can be an oval with a parabola-type thing, that's one case if the three roots of the right side are different and real. If two of the roots are the same, you get this loopy thing or this weird smooth parabola thing, depending on whether the double root is on the side that goes to infinity or on the side that goes to negative infinity. And if two roots are imaginary, then you just get a parabola thing. But the coolest is if all three roots are the same; then you get a cusp. It's also a parabola thing; this one is Neile's. It's insane how I just call everything a parabola, isn't it?

Narrator: Insane. This guy should be put into a deprivation chamber with Mozart and then shot in a way that only spends one bullet for both.

Newton: Tee hee! This will be an appendix to my book on Opticks!

Narrator: That doesn't make any sense.

Newton: Eat my dust, Leibniz! Acid swine! Calculus, physics, and the world are mine! Everyone will be chanting the laws of Newton when I'm through here! I know not what I appear to the world, but to myself I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or a prettier shell, whilst the great

ocean of truth lay all undiscovered before me. Except the world is mine! Giants are standing on my shoulders! ACID SWINE!

Curtain falls.

Act V

Sane dark room, as always. Satan sports his blue hourglass-looking thing while God entertains himself by putting a Tesla coil next to a metal file cabinet and burning Kleenex tissues in sudden puffs of fire.

God: Plans?

Satan: Yes, yes… It is early in the 1800's now, and while people barely appreciate Beethoven yet, while the craziest wars are being fought, while Gauss discovers but does not divulge hyperbolic geometry and number theory takes a much more advanced form, linear algebra is lagging just a little behind…

God: *(Surprised, not yelling)* No!

Satan: It's time to play a little trick on "reality".

God: You can't let them find out that they're in the Matrix!

Satan: They won't know it if they do, anyway. But we're eigenvectors, so we're all right. *(Ba dum tsh!)*

God: What does that blue thing do?

Satan: I've been waiting to tell you! It allows the user, if said user is an eigenvector, to take the form of any element of the target vector space.

God: You mean…

Satan: No, actually, I mean it the other way around. Basically, I can infiltrate the body of any person I want.

God: Ah, I see… You're acting like an agent.

Satan: I've always wanted to be called Augustin. Or Smith.

God: Be careful out there.

Satan: Careful is my middle name!

God: *(Thinks about it for a bit)* I don't think Careful is your middle name at all, Lucy.

Satan: Sure, it is.

God: I don't think so. You and that Austin guy with odd words as middle names…

Satan: Yeah, yeah, the joke's over. Anyway, time to put the order back in the hors d'oeuvres. *(Exits.)*

God: *(Is puzzled.)*

Lights fade out.

Narrator: We have solved linears, quadratics, cubics, and quartics, but what about the quintic? Why haven't people been able to solve it? Are they stupid? Are they acid swine?

Lights fade in on Ruffini, who is holding a book and wearing very thick glasses, a pocket protector, and other such nerdy items.

Ruffini: A! D! And! D! Yaaaaaay! Yeah, guys, I leveled up!

There is silence. There isn't anyone else onstage.

Ruffini: Guys? *(Silence.)* Guess what! I proved that the quintic is insoluble! Signor Lagrange? I proved the quintic is insoluble! Signor Lagrange, please, read my book!

A few guys enter. They're bigger than Ruffini and somewhat scary.

Guy 1: Muck-eater, what's up?

Ruffini: I just proved that the quintic is insoluble!

Guy 2: You made out with your mom? Haaa ha!

Guy 1 gives Ruffini a wedgie and smacks his face.

Ruffini: Hey! Leave me alone!

Guy 2: Shut up, punk! Hey, let me see that book.

Ruffini: Hey, that's mine!

Guy 1: Not anymore! Ha ha! Punk!

Cauchy enters. He really is Satan, but in another shape, of course.

Cauchy: What's going on here?

Ruffini: These guys stole my book! And they want to beat me up!

Cauchy: Give me that book or face… DEATH AT THE FIERY PITS OF VESUVIUS!

Guys 1 and 2: Uh, here, we don't want no trouble! Take it!

Cauchy: DON'T USE NO DOUBLE NEGATIVES! Now get out of my face. SCRAM!

Guys 1 and 2: Uh, bye! *(They exit, mumbling about Vesuvius and acid swine.)*

Cauchy: What's this book about?

Ruffini: I proved that the quintic is insoluble! And I invented group theory, too! Well, I based it off of Lagrange's work, but most of the group ideas are mine! And nobody is even paying attention to it!

Cauchy: Say. This is sweet. You proved that the quintic (and higher degree polynomials) are generally insoluble by radicals, and this is worthy of attention by mathematicians. Now I must go.

Ruffini: But nobody else is paying any attention, and people said I proposed to prove it but it's really proven there, honest!

Cauchy: Goodbye. *(Exits.)*

Ruffini: Ah, oh, no, what will I do now? Nobody cares about me! I'm just going to catch typhus fever and die! *(Catches typhus fever and dies.)*

Narrator: It's not particularly odd that this remarkable achievement went completely without people even caring. This happens whenever something sufficiently novel hits the mathematical shelves. What's odd is that Cauchy cared.

Scene changes. It's Norway, and there are fjords everywhere. A blond boy holds a pamphlet and is running around screaming without any shoes. In a classroom.

Narrator: And this – THIS – is Niels Abel. Because of war, Norway is in poverty and hunger, but this guy is poor for a different reason. His father was a drunkard and his mother had lax morals.

Abel: Where's the teacher? And where's Bob?

A man comes in with books; his name is Bernt Holmboe.

Holmboe: I'm the new teacher. I am good. I will teach you math the right way.

Abel: What happened to our old teacher?

Holmboe: He tried teaching math the wrong way. He failed. Miserably.

Abel: What?

Holmboe: You're a precocious little child, aren't you?

Abel: What are you talking about?

Holmboe: Well, Bob here… failed to turn in his homework. And your old teacher… gave him one too many hits of the cane, if you know what I mean.

Abel: What do you mean?

Holmboe: What do you think I mean? He was supposed to give Bob x hits with the cane, except he gave him $x + 1$! By Thor! And HE KILLED BOB!

Abel: x? $x + 1$? Does that mean that the quintic is insoluble?

Holmboe: My goodness, what talent!

Narrator: It's a cataclysm. Then Abel's dad died, and life began to really suck for this guy. Finally, he got something written.

Everyone exits; Abel comes in ten years older. The scene is somewhere in continental Europe.

Abel: I proved the quintic insoluble! Now I need a university position. Cauchy?

Cauchy: *(Enters.)* What is it now? I'm busy!

Abel: Will you read my paper? I proved the quintic to be insoluble.

Cauchy: Yeah, yeah, I'll do it later.

Abel: Please, quickly; I can only afford to eat one meal a day!

Cauchy: Yeah, yeah, later.

Abel: But…

Crelle enters; he's a very nice guy.

Crelle: What's wrong?

Abel: He won't read my paper, and I'm starving!

Crelle: Dude, I'll do everything I can to help you out. Go home and rest.

Abel: OK…

Norway.

Abel: Oh, oh, oh, I'm about to die! I'm sick! I'm very, very ill! Oh, no! Death! I'm going to face death! Help me! Ah! Oh, agony! Agony! Agonizing agony! Death! No! I'm going to die of TB because I'm so poor! If Cauchy had given me a university position, I'd be alive! No! *(Stops breathing.)* Gasp! Gasp! No! *(Dies.)*

Crelle: Hey, Niels, I got a spot for you at Berlin!

Cauchy: AH HA HA HA HA HA HA HAAA!

Thunder strikes.

Narrator: Cauchy kills Abel.

God: Tsk tsk!

Cauchy: What, am I my brother's keeper? Ha ha ha!

God: Holy— You're—

Cauchy: Don't give it away, will you?

Narrator: Anyways. Some other monumental work on the theory of solvability of equations came from another young mathematician…

The scene is France, at the Ecole Normale. A young man, aloof in his thoughts, wanders in and runs into Cauchy.

Galois: Oh! Excuse me.

Cauchy: Watch where you're going, young man!

Galois: Brute force got me far. I did work on the theory of equations.

Cauchy: What action do you want, a cookie? Abel has done this before!

Galois: Then I will send this new paper, on which equations can be solved by radicals, to Fourier for it to be considered for the Grand Prize in mathematics. Ah, sorry to be wearing such bad clothing.

Cauchy: Suit yourself.

Narrator: Fourier receives the inflammatory paper and dies immediately of third-degree burns.

Cauchy: Ha, ha, who's going to help you now, Galois?

Frenchman: Can I help you?

Galois: Who are you?

Frenchman: Want to join our revolution?

Galois: Sure, let's go.

King: AAAAAH! DO NOT REVOLVE AGAINST ME! OFF TO JAIL YOU GO!

Stephanie: Hi, Evariste!

Galois: *(Is in love.)*

Stephanie: Bye, bye!

Perscheux: WHAT ARE YOU DOING WITH MY GIRL?

Galois: I'm… in love!

Perscheux: Duel tomorrow!

Galois: I must… I must write all I know of group theory now so that if I die, my work will not die with me. Help me in spirit, Steph!

Perscheux: Bang!

Galois: Aaah! *(Dies.)*

Cauchy: OH! YOU'RE DEAD! And this time, it wasn't even me. Well, back to work. I'll see you in hell! *(Transforms into the devil and disappears. Curtain falls.)*

Act VI

Same dark room, AGAIN.

Satan: Pow! Pow! Pow!

God: Those guys… Why'd you kill them? They were good guys who just wanted to not solve quintics!

Satan: Because it's fun! Weeeee!

God: I hate you.

Satan: That's because we're mortal enemies, remember?

God: Eh. True. Damn it, what's up with logic? Why does it get to beat me when I'm wrong? I'm supposed to be omniscient here.

Satan: WERE omniscient. I bet you don't know what I'm thinking right now.

God: Of course I do. You're thinking of that time when you woke up naked on the floor with those guys from Friends. You'd think they'd have girlfriends and wives, too. And you'd think you'd have some decency.

Satan: Ah… Shut up.

God: And what about that time when –

Satan: Enough already. So you can read minds. Big deal. So why don't you ever do it?

God: Because it would prove my existence, which, in turn, would make me disappear in a puff of logic because I'm based solely on faith.

Satan: You stole that from Oolon Colluphid!

God: Or, rather, I gave him the idea. Besides, his proof assumes the existence of the Babel fish. And, as we all know, the tower of Babel is a tower, not a pond. There are no fish in Babel. Therefore, a Babel fish can't exist, and therefore, I still exist.

Satan: But you just…

God: Here it's OK. Just not there.

Satan: Ooh.

God: So what do you think of this Wiles character?

Satan: Acid swine.

God: Don't like the fact that he answered your pet unanswerable question, do you? Well, who cares, you get to spend eternity in Hell. It's dark and Hell is hot.

Satan: Proved Fermat's Last. How did he do it?

God: Not sure. Well, he proved the Shimura-Taniyama conjecture in the semistable case. And Frey's elliptic curve relating to Fermat's equation was semistable, but it was also shown to not be modular. And by the conjecture he proved, all elliptic curves are modular. So the Frey curve doesn't work, and consequently, Fermat has no solutions.

Satan: Whoa. When did you learn this math stuff?

God: One word. It begins with O and rhymes with "quomniscient."

Satan: So we went from introducing the cubic to actually having the rational solutions to one in two variables studied carefully, through the study of groups and algebraic solutions.

God: Yes, I suppose we did that.

Satan: Have you no shame? You give math a bad name!

God: How? What are you talking about?

Satan: You know damn right! You kick my dog!

God: You know what? I'm sick and tired of you and your horsing around meaninglessly, making people suffer. Remove thyself from limbo!

Satan: You can't do that! Jurisdiction!

God: There's another one of those omnis that you're forgetting. Omniscient, omnivorous, omnidirectional, omnipresent, and?

Satan: Please?

God: Omnipotent! That's right! You guessed the hundred cajillion dollar question!

Satan: That number doesn't even exist.

God: Damn! How come logic always has to mess everything up?

Satan: So you can't control logic?

God: It's different. I *choose* not to control logic.

Satan: That's evil.

God: Evil? Wait, so you know…

Satan: Take it off!

God: *(Rips off mask.)* I AM SATAN!

Satan: *(Rips off mask.)* AND I AM GOD!

God: No, you're not.

Satan: Damn. Well, you're not me.

God: I can be if I want. Omnipotence.

Satan: If there are two of me, Limbo will explode.

God: Hadn't thought of that…

Explosion. Curtain falls.

Narrator: The play is over. Y'all clap. So it turns out that you can actually read about most of this history stuff online, at the Mactutor History of Mathematics Archive at http://www-gap.dcs.st-and.ac.uk/~history (St. Andrews, Scotland; E. F. Robertson and J. J. O'Connor). They really have everything there. Biographies of EVERYONE, with background historical information, and everything. Of course, actual mathematical content is much richer in specialized books; Carl Boyer's A History of Mathematics is especially wonderful. The curve stuff came from Mactutor's Famous Curves index. You have NO CLUE how much stuff they have there.