

π (Pi)

by

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Max Cohen (Sean Gullette), a mathematician who specializes in number theory is obsessed with finding the numerical basis and pattern of the universe. He believes that through this he can predict the fluctuations of everything, including the stock market. Because of a childhood accident, he suffers from migraines and seizures that result in hallucinations. As his work progresses, he is pursued by Marcy Dawson (Pamela Hart) from a corporation that wants to control the world's economy and offers Max a top-secret military computer chip to upgrade his computer. He also meets Lenny Meyer (Ben Shenkman), a Hassidic Jew who studies Cabbalah and, with his associates, wants to hasten the Messianic age by discovering and reciting the true name of God (which corresponds to a 216-digit number). His computer comes up with a 216-digit bug, then crashes and burns. With the help of his teacher, Sol Robeson (Mark Margolis), he discovers and memorizes the magical number. Dawson and her thugs threaten him to get the number; Lenny and Rabbi Cohen (Stephen Pearlman) rescue him only to threaten him themselves. But understanding the roots of the universe is too much for Max, so he lobotomizes himself. (Rated R).

Pi (π) is both the sixteenth letter of the Greek alphabet and the symbol for the ratio of the circle's circumference to its diameter. If you divide a circle's circumference by its diameter you will get a number familiar to most school children, 3.14. Or, more accurately, 3.1416. Or more accurately, 3.14160982.... By all known accounts, the number never rounds off – you can continue dividing forever and keep adding digits forever. Computers have written millions of digits after the 3.14. This is known as an irrational number, a number that can be approached but never determined exactly.

In many ways π is an irrational film about irrational numbers used to symbolize irrational theological concepts. Using the non-mathematical meaning of the word, π is an irrational film about an irrational man on an irrational quest.

Since, like its title, the film can apparently be approached but never truly comprehended, I want to start at the beginning of the film and then meander wherever the analysis takes us.

This film undertakes three simultaneous and interrelated tasks. It goes to great lengths to explain some of its symbols and mathematical concepts. Icarus, Archimedes, Cabbalah, the Fibonacci series and other aspects of the film are explained in enough detail that the audience feels somewhat grounded in this strange world of number theory, mysticism and hallucination. However, this feeling, as I shall show, is false, terribly false. The film's second undertaking is to use mathematics as psychological symbols. Some of

these are explained, like π , so we can figure out relatively easily what they mean. However, others, like “*i*,” are left obscure, leaving us to uncover them – this is the film’s third level. In what follows, I will bounce back and forth between these levels as they come up. Let me begin at the beginning.

Under the opening titles are flashes of mathematical symbols, formulas and graphs superimposed on images of neurons. The thesis is plainly stated even if it is through visual symbols: there is a relation between mathematics and biology, and that relation exists in the brain.

Almost immediately after the titles, this thesis is restated verbally by Max, clearly a tortured genius on the verge of insanity. Max believes that “Mathematics is the language of nature. Everything around us can be represented and understood through numbers. If you graph the numbers in any system, patterns emerge. Therefore, there are patterns everywhere in nature.” And there are patterns everywhere in this film.

As Max wanders through the disorienting subway tubes, dank and confusing (which are clearly representations of his internal state) or sits and putters in his apartment cluttered with partially assembled, partially disassembled computer equipment protected by triple paranoid locks on the door (another representation of his mind), he (and the film) walks us through a catalog of the ways in which humanity seeks to organize the universe, to seek the name of God.

As Max seeks the ultimate pattern, he (and we) enters a world that demonstrates, displays and recaps many previous means of seeking that pattern. For instance, immediately after we see Max for the first time, we see him walking behind a group of people doing Tai Chi Chuan. This repeats the idea presented beneath the titles – that mathematics and neurons are somehow connected. Tai Chi is one of those paths to the connection between the human and the cosmic, a carefully controlled and worked out movement pattern that reflects the order of the universe.

Next, we then learn that at age six, Max stared at the sun and went temporarily blind. He recovers his sight but is plagued by migraine headaches. “Something had changed inside me.” Staring into the sun is the childhood equivalent of his adult quest: looking for the number underlying the universe, the name of God. The Sun is a miniature of what will come later; here it is the center of our solar system (rather than the universe) and represents the god Apollo (rather than the God underlying everything). It is noteworthy that, at the time of his eye injury, it was his mother of told him not to stare into the sun. Thus, the film introduces very early the idea disobeying the feminine was at the beginning of both his quest and his troubles.

There are other representations of the feminine. Jenna, a little Chinese girl, plays mathematical games with the adult Max. She gives him problems to solve in his head that she does on a hand calculator. The youthful feminine represents one aspect of mathematics, play. Just as Max disobeyed his mother by staring at the sun, here he

disobeys Jenna by taking math too seriously. Since, in the first few minutes of the film, he has disobeyed the feminine twice, we know he is headed for trouble.

One of the numbers which Jenna asks Max to calculate is an irrational number, ending in the sequence .18181818 . . . that goes on forever. Just as in mathematical work one can continue calculating, but never really achieve the exact number, so with spiritual work, one can approach but never obtain the ultimate. Irrational numbers are metaphors for Max's (and everyone else's) quest for God – approachable but not achievable.

Max's next interaction is with Devi (Samia Shoalb), the East Indian girl next door. Another representation of the feminine, she worries about Max and leaves him food. In fact, later she will turn out (indirectly) to be one of the pathways to the magical number. Max will press the "Return" key on his computer when he hears her making love next door. Among Hindu (note that Devi is East Indian) beliefs is a system in which the path to enlightenment is taken through controlled sexual activity – Kundalini Yoga (there are also similarities here to the sexual aspects of Tantric Buddhism). Another in the film's world catalog of means of achieving transcendence.

However, it is not only the positive feminine that π presents to Max. Marcy Dawson is the negative feminine, one who has transmuted/corrupted the power of nurturing into the power of economic gain. Once Max accepts the advanced and illegal computer chip from her, we know he is doomed. (We never see Max eat the food left for him by Devi.) The other negative feminine is Max's landlady. All she is interested in is her property. She is a variation on Marcy Dawson; both are committed to the god of Mammon.

In the emotional and psychological desert of New York City, Max doesn't follow the path of Jesus and resists temptation. He accepts a computer chip bribe from Marcy Dawson. This is Max's fatal error. Most of the time he follows his (mostly mathematical) intuition as best he can considering it has been damaged. Throughout the film, Max suffers nosebleeds associated with his headaches and his convulsions. At the symbolic level, Jung claims the nose to be the organ of intuition. Thus, Max's intuition is damaged and wounded. He cannot distinguish those who can help him from those who are out to harm him. He cannot sense that the path he is obsessed with is the path to his own destruction. He has no "nose" for the events taking place around him.

When Max visits his mentor/father-figure, Sol Robeson, we encounter some more symbolism that π explains at great lengths. For example, Robeson's fish is named Icarus. Robeson recounts the story of Icarus to Max (I cannot imagine anyone "published at 16, Ph.D. at 20," as Max was, who wouldn't have known it, so the extended explanation must be for the benefit of the audience). Icarus came too close to the sun and was burned. He fell into the ocean to his death. The stories (attempting to escape a restricting prison, reaching too high, damage from the sun, the plunge into the unconscious of the ocean) are the same.

On a later visit, Robeson carefully recounts the story of Archimedes discovering a way to determine the density of object. The bottom line is for Max to “take it easy, go home and take a bath.” However, we must realize that this advice came from Archimedes’ wife – the feminine which Max has trouble listening to.

By the way, Robeson’s first name is Sol. This is a contraction of Solomon, the Biblical symbol for wisdom. And certainly, Robeson functions in this way for Max. Solomon also rebuilt the Temple and, through Robeson’s hints, Max performs a parallel activity, though with far less success. Sol, in addition to its Biblical reference, is also a name for our Sun – and here again we have references to staring into the sun (knowledge in this case) and getting burned (for disobeying Sol’s advice to get out of his obsessive pursuit).

Another means of seeking the infinite also explained clearly is the Cabbalah. Lenny, a Jewish numerologist, explains that in Hebrew, each letter has a numerical equivalent. As he demonstrates to Max, the sum of the numbers for “man” (3) and “woman” (41) equals the number for “child” (44). Thus, every word in the Torah can be replaced with any word of equivalent numerical value. This numerically based search for the hidden meanings in the Torah is one of the undertakings of Cabbalah. (Another of π ’s vast catalog of seeker’s paths.)

In religious practice, the name of God is so powerful that layers of linguistic removal protect us from it. What most people take to be the English name of God, Jehovah, is actually a minor corruption of the Hebrew Yahweh. In the Hebrew (in which the Torah is written) the vowels are omitted. Thus, Yahweh becomes the word YHVH – Yod, Hey, Vov, Hey. This itself is an acronym like IBM or FBI. It stands for “The Holy Unmentionable Name of God.” And thus, even a reference to God’s “unmentionable” name is too dangerous to be spoken and is subsumed into an even presumably safer acronym that itself has become a word in our vocabulary. The films Cabbalists explain that they are seeking the 216-digit true name for God.

There are other aspects of π that are quite obscure and challenge us to unearth them from the obscure recesses of mathematics or mythology. One delightful example is Max’s (apparent) hallucination of a man on a subway singing, “I Only Have Eyes for You.” This is the title we hear, however, a mathematician might hear, “I Only Have i ’s For You,” i being the symbol for the imaginary number, $\sqrt{-1}$. An in-joke, yes, but it also informs us about the state of Max’s mind – it is being flooded with imaginary numbers (the 216-digit name of God) and other imaginings. Being a reciter of imaginary numbers, the singing man, of course, immediately disappears.

Later, Max finds a sticky, presumably sweet substance in his computer. He stains it with iodine (the chemical symbol for iodine is “I” – closely related to i) and inspects it under a microscope. What he sees is a spiral with the letter “e” in the middle. This is another obscure (to us mathematical pedestrians) reference – e is the “Napierian number” (itself irrational) and the basis of the system of logarithms. (He borrows the iodine from the girl next door who thinks he is examining a potato (note that potatoes have “eyes,” ...

“i’s”?). That she should be concerned with nutrition that comes from underground, i.e., the unconscious, seems perfectly apt for the mother image.)

In a web of symbolism so complex other, more common things take on meaning. When Max’s computer dies, for instance, he – like all of us – simultaneously presses the Ctrl, Alt, and Del keys trying to restart his computer. It doesn’t work, perhaps things are out of his “Ctrl,” he has no “Alt,” and because of his obsession he cannot “Del” what he has embarked upon.

This interpretation may seem a bit outrageous but compared to what is actually going on in the film, it is quite conservative and tame. For instance, we are told that when a computer dies, for a moment it achieves a kind of sentience and, in its dying “breath,” spits out the 216-digit number that is the name of God. Of all the ways the film describes how people have enumerated the image of God, this is the most bizarre.

Max’s computer dies because of a bug, but in this case, it is a literal bug, an ant. Unlike the bug-like bug in *Brazil*, ants are not bugs, nor do we think of them as bug-like. However, ants do represent a pattern to the universe, a pattern of communality, of hierarchy, of a corporate personality. To further reinforce this type of “joining in the collective” to approach god idea, the ant leaves a sweet, sticky substance in Max’s computer, just like a bee (the other famous member of the communal insect community).

Again, when Max hallucinates that he sees a brain sitting on the stairs in a subway, he pokes at it with a pencil. The result is a very loud humming sound. Sound is another approach to God. Either repeating magical words or by simply making the right sounds, the door to enlightenment may open. These musical/sound traditions are found around the world, from Tibetan Monks to Franciscan Friars to the use of the Australian didjeridu.

At another point, Robeson explains that the Japanese “Go” board is a microcosm of the universe. At first glance, it seems to be simple and orderly, almost like graph paper, but once a game (i.e., life) begins, the branches of possibilities it presents are endless. It represents a complex, chaotic universe in an apparently simple and mundane manifestation.

When Max stops taking his anti-hallucinogenic pills, anti-seizure pills and pain pills, he finally finds the magical number for the name of God. The film seems to be implying (in a manner diametrically opposed to the LSD cults of the 1960s), that drugs *prevent* not facilitate contact with God.

While passing through these methods and theories of God like a tour-bus traveler, Max finds his own way – and, unaware, very early in his life came quite close to the “truth.” When Max looked at the sun as a young boy, before everything went blank through the burning or bleaching of his retinas, he mentions that he “saw everything.” In response to a very bright light, the iris of the eye will shrink as much as possible to protect the retina. Were the eye a camera, we would say that the diaphragm stopped

down. It is well known in photography that the smaller the aperture, the greater the depth of focus. With a very tiny iris opening, it is possible that everything from very close to Max's eye to a very great distance was sharply focused, giving the impression of "seeing everything clearly."

Toward the end of the film, Max finds himself at Coney Island after falling asleep on a subway car. Thus, Coney Island could be a dream image. In dreams and other plays of symbols, the beach often represents the place where the conscious mind (the land) and the unconscious (the ocean) abut. On the beach, he sees a person with a metal detector find a seashell, turn it over, and throw it away. That this scene should be taken symbolically is clear once we realize that a seashell has no metal in it and could not be detected by an electronic device. Max picks it up, turns it over and finds the Fibonacci spiral. This encounter with math in nature predicts Max's final effort, and the place at which he will find himself – in the mathematics that comes from the unconscious, not from the external world.

Max's solution to his headaches, his visions, his pain, his hallucinations and, most of all, of letting the True Name of God into his head is to give himself a lobotomy. We last see Max sitting outdoors (for the first time) relaxing (for the first time). Jenna comes up to him wanting to play mathematical games, but he cannot, he has lost the ability to make even the simplest calculations in his head. Then he simply looks up at beautiful fall leaves against a bright sky and sees the universal order he has been seeking – in apprehension of everyday beauty.

Yet the film, despite its pessimism, holds out the hope of humanity achieving the infinite, even though that hope rests on a mathematical detail. Mathematics and religion are beautifully related in that you can't prove either one except by its own terms. The name of God is a word that is 216 digits long. It is not like π , or e , or i . It is not an irrational number, it is finite and can be determined exactly. Thus, the filmmakers imply that the magical name may be actually accessible to us all, though the toll of the quest may be beyond any of us.

π (Pi) Written and directed by Darren Aronofsky. Story by Darren Aronofsky, Sean Gullette, and Eric Watson. Cinematography by Matthew Libatique. Electronic score by Clint Mansell. Sound design by Brian Emrich. Distributed by Artisan Entertainment, 1998.