

## **An Excursion into Fiction**

*The DaVinci Code* a bestselling novel written in 2003 packs murder, a secret society, a professor, the Louvre in Paris, and the Church into a terrific story. To solve the murder, a mysterious coded message has to be deciphered. This turns out to involve several of the mathematical themes that are developed in the first three chapters of our text. The following excerpts from the book introduce the story and set the stage. The mathematical issues are taken up in the Additional Exercises of Chapter 3.

# **The DaVinci**

**Code**    A Novel

**DAN  
BROWN**

**D O U B L E D A Y**  
New York · London · Toronto · Sydney · Auckland

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## Prologue

### Louvre Museum, Paris

10:46 p.m.

Renowned curator Jacques Saunière staggered through the vaulted archway of the museum's Grand Gallery. He lunged for the nearest painting he could see, a Caravaggio. Grabbing the gilded frame, the seventy-six-year-old man heaved the masterpiece toward himself until it tore from the wall and Saunière collapsed backward in a heap beneath the canvas.

As he had anticipated, a thundering iron gate fell nearby, barricading the entrance to the suite. The parquet floor shook. Far off, an alarm began to ring.

The curator lay a moment, gasping for breath, taking stock. *I am still alive.* He crawled out from under the canvas and scanned the cavernous space for someplace to hide.

A voice spoke, chillingly close. "Do not move."

On his hands and knees, the curator froze, turning his head slowly.

Only fifteen feet away, outside the sealed gate, the mountainous silhouette of his attacker stared through the iron bars. He was broad and tall, with ghost-pale skin and thinning white hair. His irises were pink with dark red pupils. The albino drew a pistol from his coat and aimed the barrel through the bars, directly at the curator. "You should not have run." His accent was not easy to place. "Now tell me where it is."

"I told you already," the curator stammered, kneeling defenseless on the floor of the gallery. "I have no idea what you are talking about!"

"You are lying." The man stared at him, perfectly immobile except for the glint in his ghostly eyes. "You and your brethren possess something that is not yours."

The curator felt a surge of adrenaline. *How could he possibly know this?*

"Tonight the rightful guardians will be restored. Tell me where it is hidden, and you will live." The man leveled his gun at the curator's head. "Is it a secret you will die for?"

Saunière could not breathe. The man tilted his head, peering down the barrel of his gun. Saunière held up his hands in defense. "Wait," he said slowly. "I will tell you what you need to know." The curator spoke his next words carefully. The lie he told was one he had rehearsed many times ... each time praying he would never have to use it.

When the curator had finished speaking, his assailant smiled smugly. "Yes. This is exactly what the others told me."

Saunière recoiled. *The others?*

"I found them, too," the huge man taunted. "All three of them. They confirmed what you have just said."

*It cannot be!* The curator's true identity, along with the identities of his three *sénéchaux*, was almost as sacred as the ancient secret they protected. Saunière now realized his *sénéchaux*, following strict procedure, had told the same lie before their own deaths. It was part of the protocol.

The attacker aimed his gun again. "When you are gone, I will be the only one who knows the truth."

The truth. In an instant, the curator grasped the true horror of the situation. *If I die, the truth will be lost forever.* Instinctively, he tried to scramble for cover.

The gun roared, and the curator felt a searing heat as the bullet lodged in his stomach. He fell forward ... struggling against the pain. Slowly, Saunière rolled over and stared back through the bars at his attacker.

The man was not taking dead aim at Saunière's head.

Saunière closed his eyes, his thoughts a swirling tempest of fear and regret.

The click of an empty chamber echoed through the corridor.

The curator's eyes flew open.

The man glanced down at his weapon, looking almost amused. He reached for a second clip, but then seemed to reconsider, smirking calmly at Saunière's gut. "My work here is done."

The curator looked down and saw the bullet hole in his white linen shirt. It was framed by a small circle of blood a few inches below his breastbone. *My stomach.* Almost cruelly, the bullet had missed his heart. As a veteran of *la Guerre d'Algérie*, the curator had witnessed this horribly drawn-out death before. For fifteen minutes, he would survive as his stomach acids seeped into his chest cavity, slowly poisoning him from within.

"Pain is good, monsieur," the man said.

Then he was gone.

Alone now, Jacques Saunière turned his gaze again to the iron gate. He was trapped, and the doors could not be reopened for at least twenty minutes. By the time anyone got to him, he would be dead. Even so, the fear that now gripped him was a fear far greater than that of his own death.

*I must pass on the secret.*

Staggering to his feet, he pictured his three murdered brethren. He thought of the generations who had come before them ... of the mission with which they had all been entrusted.

*An unbroken chain of knowledge.*

Suddenly, now, despite all the precautions ... despite all the fail-safes ... Jacques Saunière was the only remaining link, the sole guardian of one of the most powerful secrets ever kept.

Shivering, he pulled himself to his feet.

*I must find some way. ...*

He was trapped inside the Grand Gallery, and there existed only one person on earth to whom he could pass the torch. Saunière gazed up at the walls of his opulent prison. A collection of the world's most famous paintings seemed to smile down on him like old friends.

Wincing in pain, he summoned all of his faculties and strength. The desperate task before him, he knew, would require every remaining second of his life.

## The Professor

The past year had taken a heavy toll on him, but he didn't appreciate seeing proof in the mirror. His usually sharp blue eyes looked hazy and drawn tonight. A dark stubble was shrouding his strong jaw and dimpled chin. Around his temples, the gray highlights were advancing, making their way deeper into his thicket of course black hair. Although his female colleagues insisted the gray only accentuated his bookish appeal, Langdon knew better.

*If Boston Magazine could see me now.*

Last month, much to Langdon's embarrassment, *Boston Magazine* had listed him as one of that city's top ten most intriguing people—a dubious honor that made him the brunt of endless ribbing by his Harvard colleagues. Tonight, three thousand miles from home, the accolade had resurfaced to haunt him at the lecture he had given.

"Ladies and gentlemen ..." the hostess had announced to a full house at the American university of Paris's Pavillon Dauphine, "Our guest tonight needs no introduction. He is the author of numerous books: *The Symbology of Secret Sects*, *The Art of the Illuminati*, *The Lost Language of Ideograms*, and when I say he wrote the book on *Religious Iconology*, I mean that quite literally. Many of you use his textbooks in class."

The students in the crowd nodded enthusiastically.

"I had planned to introduce him tonight by sharing his impressive curriculum vitae. However ..." She glanced playfully at Langdon, who was seated onstage. "An audience member has just handed me a far more, shall we say ... intriguing introduction."

She held up a copy of *Boston Magazine*.

Langdon cringed. *Where the hell did she get that?*

The hostess began reading choice excerpts from the inane article, and Langdon felt himself sinking lower and lower in his chair. Thirty seconds later, the crowd was grinning, and the woman showed no signs of letting up. "And Mr. Langdon's refusal to speak publicly about his unusual role in last year's Vatican conclave certainly wins him points on our intrigue-o-meter." The hostess goaded the crowd. "Would you like to hear more?"

The crowd applauded.

*Somebody stop her*, Langdon pleaded as she dove into the article again.

"Although Professor Langdon might not be considered hunk-handsome like some of our younger awardees, this forty-something academic has more than his share of scholarly allure. His captivating presence is punctuated by an unusually low, baritone speaking voice, which his female students describe as 'chocolate for the ears.' "

The hall erupted in laughter.

Langdon forced an awkward smile. He knew what came next – some ridiculous line about “Harrison Ford in Harris tweed” – and because this evening he had figured it was finally safe again to wear his Harris tweed and Burberry turtleneck, he decided to take action.

“Thank you, Monique,” Langdon said, standing prematurely and edging her away from the podium. “*Boston Magazine* clearly has a gift for fiction.” He turned to the audience with an embarrassed sigh. “And if I find which one of you provided that article, I’ll have the consulate deport you.”

The crowd laughed.

“Well, folks, as you know, I’m here tonight to talk about the power of symbols ...”

## The Detective

Captain Bezu Fache carried himself like an angry ox, with his wide shoulders thrown back and his chin tucked hard into his chest. His dark hair was slicked back with oil, accentuating an arrow-like widow’s peak that divided his jutting brow and preceded him like the prow of a battleship. As he advanced, his dark eyes seemed to scorch the earth before him, radiating a fiery clarity that forecast his reputation for unblinking severity in all matters.

Langdon followed the captain down the famous marble staircase into the sunken atrium beneath the glass pyramid. As they descended, they passed between to armed Judicial Police guards with machine guns. The message was clear: Nobody goes in or out tonight without the blessing of Captain Fache.

## The Code

Langdon couldn’t tear his eyes from the glowing purple text scrawled across the parquet floor. Jacques Saunière’s final communication seemed as unlikely a departing message as any Langdon could imagine.

The message read:

13-3-2-21-1-1-8-5  
O, Draconian devil!  
Oh, lame saint!

Although Langdon had not the slightest idea what it meant, he did understand Fache's instinct that the pentacle had something to do with devil worship.

*O, Draconian devil!*

Saunière had left a literal reference to the devil. Equally as bizarre was the series of numbers. "Part of it looks like a numeric cipher."

"Yes," Fache said. "Our cryptographers are already working on it. We believe these numbers may be the key to who killed him. Maybe a telephone exchange or some kind of social identification. Do the numbers have any symbolic meaning to you?"

Langdon looked again at the digits, sensing it would take him hours to extract any symbolic meaning. *If Saunière had even intended any.* To Langdon, the numbers looked totally random. He was accustomed to symbolic progressions that made some semblance of sense, but everything here – the pentacle, the text, the numbers – seemed disparate at the most fundamental level.

"You alleged earlier," Fache said, "that Saunière's actions here were all in an effort to send some sort of message ... goddess worship or something in that vein? How does this message fit in?"

Langdon knew the question was rhetorical. This bizarre communiqué obviously did not fit Langdon's scenario of goddess worship at all.

## The Cryptologist

*"Capitaine, un agent du Département de Cryptographie est arrive."*

Fache's anger stalled momentarily. *A cryptographer?* Despite the lousy timing, this was probably good news. Fache, after finding Saunière's cryptic text on the floor, had uploaded photographs of the entire crime scene to the Cryptography Department in hopes someone there could tell him what the hell Saunière was trying to say. If a code breaker had now arrived, it most likely meant someone had decrypted Saunière's message.

"I'm busy at the moment," Fache radioed back, leaving no doubt in his tone that a line had been crossed. "Ask the cryptographer to wait at the command post. I'll speak to him when I'm done."

"Her," the voice corrected. "It's Agent Neveu."

Fache was becoming less amused with this call every passing moment. Sophie Neveu was one of DCPJ's biggest mistakes. A young Parisian *déchiffreuse* who had studied cryptography in England at the Royal Holloway, Sophie Neveu had been foisted on Fache two years ago as part of the ministry's attempt to incorporate more women into the police force. The ministry's ongoing foray into political correctness,

Fache argued, was weakening the department. Women not only lacked the physicality necessary for police work, but their mere presence posed a dangerous distraction to the men in the field. As Fache has feared, Sophie Neveu was proving far more distracting than most.

At thirty-two years old, she had a dogged determination that bordered on obstinate. Her eager espousal of Britain's new cryptologic methodology continually exasperated the veteran French cryptographers about her. And by far the most troubling to Fache was the inescapable universal truth that in an office of middle-aged men, an attractive young woman always drew eyes away from the work at hand.

*"Excusez-moi, messieurs."*

Langdon turned to see a young woman approaching. She was moving down the corridor toward them with long, fluid strides ... a haunting certainty to her gait. Dressed casually in a knee-length, cream-colored Irish sweater over black leggings, she was attractive and looked to be about thirty. Her thick burgundy hair fell unstyled to her shoulders, framing the warmth of her face. Unlike the waifish, cookie-cutter blondes that adorned Harvard dorm room walls, this woman was healthy with an unembellished beauty and genuineness that radiated a striking personal confidence.

To Langdon's surprise, the woman walked directly up to him and extended a polite hand. "Monsieur Langdon, I am Agent Neveu from DCPJ's Cryptology Department." Her words curved richly around her muted Anglo-Franco accent. "It is a pleasure to meet you."

Langdon took her soft palm in his and felt himself momentarily fixed in her strong gaze. Her eyes were olive-green—incisive and clear.

## The Fibonacci Sequence

*"Une plaisanterie numrique?"* Bezu Fache was livid, glaring at Sophie Neveu in disbelief. *A numeric joke?* "Your professional assessment of Saunière's code is that it is some kind of mathematical prank?"

Fache was in utter incomprehension of this woman's gall. Not only had she just barged in on Fache without permission, but she was now trying to convince him that Saunière, in his final moments of life, had been inspired to leave a mathematical gag?

"This code," Sophie explained in rapid French, "is simplistic to the point of absurdity. Jacques Saunière must have known we would see through it immediately." She pulled a scrap of paper from her sweater pocket and handed it to Fache. "Here is the decryption."

Fache looked at the card.



"This is it?" he snapped. "All you did was put the numbers in increasing order!" Sophie actually had the nerve to give a satisfied smile. "Exactly."

Fache's tone lowered to a guttural rumble. "Agent Neveu, I have no idea where the hell you're going with this, but I suggest you get there fast." He shot an anxious glance at Langdon, who stood nearby with the phone pressed to his ear, apparently still listening to his phone message from the U.S. Embassy. From Langdon's ashen expression, Fache sensed the news was bad.

"Captain," Sophie said, her tone dangerously defiant, "the sequence of numbers you have in your hands happens to be one of the most famous mathematical progressions in history."

Fache was not aware there even existed a mathematical progression that qualified as famous, and he certainly didn't appreciate Sophie's off-handed tone.

"This is the Fibonacci sequence," she declared, "...

## The Number $\phi$

Langdon was surprised. "Your grandfather taught you about the number PHI?"

"Of course. The Divine Proportion." Her expression turned sheepish. "In fact, he used to joke that I was half divine ... you know, because of the letters in my name."

Langdon considered it a moment and then groaned.

*s-o-PHI-e.*

Still descending, Langdon refocused on PHI. He was starting to realize that Saunière's clues were even more consistent than he had first imagined.

*Da Vinci ... Fibonacci numbers ... the pentacle.*

Incredibly, all of these things were connected by a single concept so fundamental to art history that Langdon often spent several class periods on the topic.

*PHI.*

He felt himself suddenly reeling back to Harvard, standing in front of his "Symbolism in Art" class, writing his favorite number on the chalkboard.

1.618

Langdon turned to face his sea of eager students. "Who can tell me what this number is?"

A long-legged math major in back raised his hand. "That's the number PHI." He pronounced it *fee* ....

As Langdon loaded his slide projector, he explained that the number PHI was derived from the Fibonacci sequence—a progression famous not only because the sum of adjacent terms equaled the next term, but because the *quotients* of adjacent terms possessed the astonishing property of approaching the number 1.618—PHI!

Despite PHI's seemingly mystical mathematical origins, Langdon explained, the truly mind-boggling aspect of PHI was its role as a fundamental building block in nature. Plants, animals, and even human beings, all possessed dimensional properties that adhered with eerie exactitude to the ratio of PHI to 1.

"PHI's ubiquity in nature," Langdon said, killing the lights, "clearly exceeds coincidence, and so the ancients assumed the number PHI must have been preordained by the Creator of the universe. Early scientists heralded one-point-six-one-eight as the *Divine Proportion*."

"Hold on," said a young woman in the front row. "I'm a bio major and I've never seen this Divine Proportion in nature."

"No?" Langdon grinned. "Ever study the relationship between female and males in a honeybee community?"

"Sure. The female bees always outnumber the male bees."

"Correct. And did you know that if you divide the number of female bees by the number of male bees in any beehive in the world, you always get the same number?"

"You do?"

"Yup. PHI."

The girl gaped. "NO WAY!"

"Way!" Langdon fired back, smiling as he projected a slide of a spiral seashell. "Recognize this?"

"It's a nautilus," the bio major said. "A cephalopod mollusk that pumps gas into its chambered shell to adjust its buoyancy."

"Correct. And can you guess what the ratio is of each spiral's diameter to the next?"

The girl looked uncertain as she eyed the concentric arcs of the nautilus spiral.

Langdon nodded. "PHI. The Divine Proportion. One-point-six-one-eight to one."

The girl looked amazed.

Langdon advanced to the next slide—a close-up of a sunflower's seed head. "Sunflower seeds grow in opposing spirals. Can you guess the ratio of each rotation's diameter to the next?"

"PHI?" everyone said.

"Bingo." Langdon began racing through slides now—spiraled pinecone petals, leaf arrangement on plant stalks, insect segmentation—all displaying astonishing obedience to the Divine Proportion.

"This is amazing!" someone cried out.

"Yeah," someone else said, "but what does it have to do with art?"

"Aha!" Langdon said. "Glad you asked." He pulled up another slide—a pale yellow parchment displaying Leonardo da Vinci's famous male nude—*The Vitruvian Man*—named for Marcus Vitruvius, the brilliant Roman architect who praised the Divine Proportion in his text *De Architectura*.

"Nobody understood better than Da Vinci the divine structure of the human body. Da Vinci actually *exhumed* corpses to measure the exact proportions of human bone structure. He was the first to show that the human body is literally made of building blocks whose proportional ratios *always* equal PHI."

Everyone in class gave him a dubious look.

"Don't believe me?" Langdon challenged. "Next time you're in the shower, take a tape measure."

A couple of football players snickered.

"Not just you insecure jocks," Langdon promoted. "All of you. Guys and girls. Try it. Measure the distance from the top of your head to the floor. Then divide that by the distance from your belly button to the floor. Guess what number you get."

"Not PHI!" one of the jocks blurted out in disbelief.

"Yes, PHI," Langdon replied. "One-point-six-one-eight. Want another example? Measure the distance from your shoulder to your fingertips, and then divide it by the distance from your elbow to your fingertips. PHI again. Another? Hip to floor divided by knee to floor. PHI again. Finger joints. Toes. Spinal divisions. PHI. PHI. PHI. PHI. My friends, each of you is a walking tribute to the Divine Proportion."

Even in the darkness, Langdon could see they were all astounded. He felt familiar warmth inside. This is why he taught. "My friends, as you can see, the chaos of the world has an underlying order. When the ancients discovered PHI, they were certain they had stumbled across God's building block for the world, and they worshipped Nature because of that. And one can understand why. God's hand is evident in Nature, and even to this day there exist pagan, Mother Earth—revering religions. Many of us celebrate nature the way pagans did, and don't even know it. May Day is a perfect example, the celebration of spring the earth coming back to life to produce her bounty. The mysterious magic inherent in the Divine Proportion was written at the beginning of time. Man is simply playing by nature's rules, and because art is man's attempt to imitate the beauty of the Creator's hand, you can imagine we might be seeing a lot of instances of the Divine Proportion in art this semester."

Over the next half hour, Langdon showed them slides of artwork by Michelangelo, Albrecht Dürer, Da Vinci, and many others, demonstrating each artist's intentional and rigorous adherence to the Divine Proportion in the layout of his compositions.

Langdon unveiled PHI in the architectural dimensions of the Greek Parthenon, the pyramids, of Egypt, and even the United Nations Building in New York. PHI appeared in organizational structures of Mozarts sonatas, Beethoven's Fifth Symphony, as well as the works of Bartók, Debussy, and Schubert. The number PHI, Langdon told them, was even used by Stradivarius to calculate the exact placement of the f-holes in the construction of his famous violins.

"In closing," Langdon said, walking to the chalkboard, "we return to *symbols*." He drew five intersecting lines that formed a five-pointed star. "This symbol is one of the most powerful images you will see this term. Formally known as a pentagram—or *pentacle*, as the ancients called it—this symbol is considered both divine and magical by many cultures. Can anyone tell me why that might be?"

Stettner, the math major, raised his hand. "Because if you draw a pentagram, the lines automatically divide themselves into segments according to the Divine Proportion."

Langdon gave the kid a proud nod. "Nice job. Yes, the ratios of line segments in a pentacle *all* equal PHI, making this symbol the *ultimate* expression of the Divine Proportion. For this reason, the five-pointed star has always been the symbol of beauty and perfection associated with the goddess and the sacred feminine."

The girls in class beamed ...

## Comments and Questions

The author weaves these characters as well as the mysterious code into an engaging, intriguing, and most provocative story. *The DaVinci Code* spent many weeks of the year 2003 on the list of 25 best selling works of fiction - a few of them as number one - that the *New York Times Book Review* compiles and Columbia pictures is making it into a film. If you have any time left in your busy day, have a go at it. But what about Professor Langdon's mathematical assertions? Are they fiction too? Are his statements about the Fibonacci sequence and all the supposed occurrences of the number  $\phi = 1.618$  in art and nature correct? The short answer is "yes and no." For starters, the numbers 1, 1, 2, 3, 5, 8, 13, 21 constitute only the beginning of the Fibonacci sequence. This progression of numbers goes on (and on) driven by the repetition of the pattern. Do you see what the pattern is? In addition, the Divine Proportion  $\phi$  is only approximately equal to 1.618. What is  $\phi$  equal to precisely? The last part of the Additional Exercises for Chapter 3 takes aim at Professor Langdon's lecture about  $\phi$ , the Fibonacci sequence, and the numerical properties of nature and art that adhere according to Langdon "with eerie exactitude to the ratio of PHI to 1."