Name: _____ Date: _____

Beyond the Perfect Ten

Reading level 13 · 1600 words

When Simone Biles won the 2024 Olympic all-around, her total for four events was 59.131. By our arithmetic that is about 14.8 an event, well above the 10 that once capped a routine. Where did that ceiling come from, and why is it gone? Biles is an American gymnast, born in Columbus, Ohio, in 1997. She had won 30 World Championships medals through 2023, the most in gymnastics history, and 11 Olympic medals through the 2024 Games in Paris. Her sport gives each routine two numbers that are added. The difficulty score comes from a table of skills, and the execution score starts at 10.000 and loses points for faults. This book follows the scale: who argued about it, and how its numbers are measured.

The rules sit in a book called the Code of Points, which the International Gymnastics Federation, or FIG, rewrites for each Olympic cycle. The women's edition for 2025 to 2028 was approved by FIG's Executive Committee in February 2024, and the copy we read carries a publication date of 14 October 2026. The Code sets up two juries. The D jury fixes the difficulty score, which is the content of an exercise. The E jury judges execution and artistry. With seven E judges, the two highest marks and the two lowest are set aside and the middle three are averaged. The result is truncated, not rounded, to three decimal places.

The old ceiling had a famous moment. On 18 July 1976 in Montreal, the 14-year-old Nadia Comaneci scored a perfect 10 at the Olympics, though FIG notes that a 10 had been awarded before, in 1967. FIG calls the scale itself positively restrictive, because it gave judges no way to separate the difficulty of a routine from the quality of its execution. Then came the 2004 Games in Athens. Reuters reported that FIG admitted it had awarded a men's all-around title in error, though it refused to redistribute the medals, and that in another final a crowd held up the competition for almost ten minutes until judges changed a score. FIG's president urged an overhaul, and the new scoring took effect in 2006.

The change drew a fair fight, and both sides are on record. Nellie Kim, then president of FIG's women's technical committee, helped design the new Code, and she told Reuters in 2008 that under the old rules even a fantastic routine meant "they could not score higher than a 10." Critics feared that chasing bigger scores would push gymnasts toward danger, and Kim answered that deductions would be much stricter, so a smart athlete would do a normal skill perfectly. Alicia Sacramone, who had competed under both codes, said she had nothing against the change but missed the perfect 10, and found it harder to tell whether a routine was flawless. FIG's tribute to its late president says the reform caused lively reactions but soon showed its advantages.

Open-ended has a precise meaning in the Code. Skills sit in a Table of Elements, which the

Code calls open ended and expandable as needed. Each skill carries a letter from A to J. An A is worth 0.10 and a J is worth 1.00. On bars, beam and floor, the D score adds the eight highest-valued skills, up to 2.00 for compositional requirements, and credit for connections and bonuses. On vault there is no adding at all, because the D score is the fixed value printed beside the vault in the table. FIG says the new system left no cap on the score a gymnast can reach. The table grows when gymnasts add skills to it.

Who sets a value? For a new skill, FIG's women's technical committee does, after the gymnast sends in a video. Any value given at a competition is provisional until the committee approves it. Values also move when the Code is revised. Before the Tokyo Games, in 2021, FIG listed Biles's piked double backward vault at 6.6, the highest a woman could then obtain. Two gymnastics sites reported that nearly every vault lost 0.4 in the 2022 to 2024 Code, and one said many expected 6.2. In 2023 FIG set 6.4, the hardest vault in the women's Code. Her first named vault went from 6.40 in 2018 to 6.00 in FIG's 2022 to 2024 Code, and the 2025 to 2028 Code keeps it at 6.00. That is the same 0.4 drop, by our arithmetic.

Some numbers about a vault are fixed by the rules, not measured. The runway may be at most 25 meters, or 82 feet. The table stands 125 centimeters high, within a tolerance of one centimeter. The rest is estimated, and the estimates differ. A Swiss sports scientist who has used lasers to time other gymnasts' runs estimated from footage that Biles is probably above 18 miles an hour near the end of the runway, about 8 meters a second by our conversion. NBC estimated that her feet reach about 12 feet, or 3.7 meters, above the mat. The Philadelphia Inquirer wrote of more than two body lengths, which is more than 2.8 meters for a gymnast about 142 centimeters tall, by our conversion of her reported height.

Once she leaves the table, one conservation law governs her spin. Angular momentum stays constant unless an outside force acts, and in the air the only outside force is gravity, so she can change her spin rate only by changing her shape. That changes her moment of inertia, which one maths magazine defines as a body's resistance to rotation, based on its mass and shape. A tuck lowers it. A pike, with straight legs, raises it, and the Inquirer notes that the same rotations would be easier in a tight somersault. The Code counts twists in degrees: her first named vault carries two full twists, which it writes as 720 degrees. By our arithmetic, a double somersault is also two full turns, or 720 degrees.

The landing is where physics meets the body. The Los Angeles Times cited a 2013 study, which it does not name, that found gymnasts absorb about 11 times their body weight in competition landings, and about 18 times when a landing is uneven. A physicist at Louisiana State University made a different calculation for her floor triple-double in 2021. He took a launch speed of 6.6 meters per second. He timed the contact from slowed video at about 200 milliseconds. The article gives his average force as about 1,700 newtons, or over three times her weight, and notes that she would feel larger forces at the peak. The two figures cannot be compared directly. They come from different studies, skills and methods, and the newspaper

does not say what its 11 times measures.

FIG's women's technical committee has explained how it thinks about risk. In 2019, Biles submitted a beam dismount with a double tucked somersault and two twists, and the committee said it weighs the risk, the safety of the gymnasts and the technical direction of the discipline. It gave the skill an H, the only H on beam, and called that value reasonable, citing the added risk of double saltos on beam dismounts, including a potential landing on the neck. It listed earlier cases where it had cut values to protect gymnasts, and it said its decisions are not based purely on one gymnast. A safety collar around the springboard is compulsory for round-off entry vaults like hers, and FIG's sheet for the collar is dated 2018.

In the team final at the Tokyo Games, held in 2021, Biles planned a vault with two and a half twists and finished one and a half. "I had no idea where I was in the air," she said that week. Gymnasts call this the twisties. A gymnast who cannot tell where she is in the air cannot know how she will land. She left the team final for safety reasons. FIG's year review describes a withdrawal from all but one Olympic final: she skipped the other individual finals, then returned for the beam final on 3 August 2021. FIG's results page shows a score of 14.000 and third place, and it was her seventh Olympic medal.

A name in the Code records a first. The rule needs a first performance at an official FIG competition, a rating of C or higher, and committee confirmation. By FIG's count in July 2024, Biles had five names. Two are on floor: the first, from Antwerp in 2013, is a double layout with a half twist, and the second, from Stuttgart in 2019, is a double tucked somersault with three twists, rated J, the top letter, worth 1.00. One is the beam dismount from 2019, and two are vaults, from Doha in 2018 and Antwerp in 2023. Only Nellie Kim, with seven, has more. FIG announced the Biles 2 in November 2023, after she landed it in qualifying in Antwerp.

As of October 2026, Biles was not competing, and FIG's profile of her lists no result after Paris 2024. On October 24, 2026, FIG reported that she made a surprise visit to the World Championships in Rotterdam. "I felt like I was getting ready to compete," she said on stage, and FIG wrote that she has not said whether she will return. Some wonder if a home Games in Los Angeles in 2028 could draw her back. The Code she would return to is the one in force through 2028. In July 2024 she submitted a sixth skill for naming, on the uneven bars. The edition of the Code dated 14 October 2026 still lists five.

Questions

1. Why did FIG's committee give Biles's beam dismount a 'reasonable' value, according to its 2019 statement?

A. Double saltos on beam dismounts carry added risk, including a potential landing on the neck

B. The skill was easy to judge

C. No judge could see it

2. How is the E score worked out when there are seven E judges?

A. All seven marks are averaged

B. The two highest and two lowest are set aside and the middle three are averaged

C. The highest mark is used

3. In the sentence 'any value given at a competition is provisional,' what does provisional mean?

A. Not yet final

B. Very high

C. Printed in a book

4. Why can the 11-times figure and the 1,700-newton figure not simply be compared?

A. Both measure the same landing

B. The sources used different methods and skills, and the 1,700-newton figure is an average while the other does not say

C. Newtons cannot measure force

5. What does 'open-ended' mean in the Code of Points?

A. Each routine may last as long as the gymnast likes

B. Judges may give any score they choose

C. The table of skills can be expanded, and no cap is set on the total score

Words to know

truncated: cut off
provisional: not yet final
inertia: resists turning
compositional: about structure
estimated: roughly worked out

Answer key: Beyond the Perfect Ten

1. A. Double saltos on beam dismounts carry added risk, including a potential landing on the neck
2. B. The two highest and two lowest are set aside and the middle three are averaged
3. A. Not yet final
4. B. The sources used different methods and skills, and the 1,700-newton figure is an average while the other does not say
5. C. The table of skills can be expanded, and no cap is set on the total score