

Women's gymnastic scoring



What happened to gymnasts receiving a perfect 10 for their routines?

In gymnastics a perfect score used to be a 10. In 1976 a young Romanian woman, Nadia Comăneci, was the first Olympic gymnast to score a 10 on any event in gymnastics. Her routine was flawless. You can watch her routine at here; <http://www.yummymath.com/2012/perfect-10/>.

Ten is no longer a perfect score. So how will gymnasts be scored at this year's Olympics?

Beware; this is a very simplified summary of the new scoring for women's artistic gymnastics.

There will be 8 judges for each gymnast's routine. Two of the judges will give a score for the difficulty of the routine (D score) and 6 judges will rank the execution score (E-score). Each contestant will receive 2 scores for each routine ... a D-score and an E-score.

- **The D-score** (or Difficulty score) evaluates the content of the exercise on three criteria: the Difficulty Value (DV), Composition Requirements (CR) and Connection Value (CV).
 - **DV:** The difficulty value of the eight highest value elements of the routine, including the dismount, is added together. Elements are ranked depending on their difficulty. Each element in a routine has a point value based on its difficulty, starting at zero and increasing by one-tenth for each subsequent level. Therefore, an "A" level skill is given a point value of one-tenth whereas an "E" level skill has a point value of five-tenths.
 - **CR:** Gymnasts must demonstrate skills from five required Element Groups on each apparatus. A gymnast may use skills to fulfill the DV and the CR simultaneously. For each CR presented, 0.5 points are awarded.
 - **CV:** Additional points are given for connections of two or more elements of specific value, with 0.1 or 0.2 points apiece.

Difficulty is *unlimited*. The most competitive athletes have "D-scores" in the high 6 to low 7's. With increased difficulty comes the risk of falling. The penalty for falling is quite costly. 1.0 is deducted from the score for each fall.

Here is an example: Calculation of the D-score for a gymnast that completed;

- 3 C elements, 3 D elements and 2 E elements
- Completed all 5 of the composition requirements
- and achieved a connection point value of .6.

$$\text{DV} \left\{ \begin{array}{ll} \text{C elements have difficulty} = .3 \text{ points} & 3 \text{ C elements} = .9 \text{ points} \\ \text{D elements have difficulty} = .4 \text{ points} & 3 \text{ D elements} = 1.2 \text{ points} \\ \text{E elements have difficulty} = .5 \text{ points} & 2 \text{ E elements} = 1.0 \text{ points} \end{array} \right. \quad \text{DV score} = 3.1 \text{ points}$$

CR - Competition requirements get .5 points each. Completing all 5 of the requirements = $5 * 0.5$ points.
CV = .6

$$\text{Total D score} = 3.1 + 2.5 + .6 = 6.1$$

1. Calculate the D-score (Difficulty Score) for a gymnast who completes 2 C elements, 3 D elements, and 3 F elements. Completes all of the 5 composition requirements and gets a connection point value of .8 points.

2. Calculate the D-score for a gymnast who completed 3 C elements, 1 D element, 1 F, and 1 G elements. Her routine was very difficult for her and she was unable to complete all 5 of the competition requirements. She only completed 4 of them successfully. She got a connection point value of .5.

3. Can you create an equation that would allow you to calculate any Difficulty score given the number of C, D, E, F and G elements + connection points and - falls?

- **The E-score** (or Execution score) evaluates the performance: the execution and artistry of the routine. The base score is 10.0. Judges do not add to this, but rather, take away points for errors in form, artistry, execution, technique and routine composition. There is a 1.0 mark deduction for falling off an apparatus. Errors are judged to be small, medium or large and respective 0.1, 0.3 and 0.5 deductions are applied.

4. Calculate the execution score for a gymnast that made 2 small errors and 1 large error

5. In 1976, Nadia Comaneci completed a perfect uneven bars routine. What would her E-score have been?

There are also **Neutral Deductions**. Neutral errors include those for stepping out of bounds or violating time requirements, as well as attire or podium violations.

For each contestant's routine in a gymnastic event there will be eight judges.

- Two judges will determine the elements and difficulty of the routine (D value = difficulty score).
- Six judges will determine the execution and artistic value of the performance (E value = execution score).

To determine the final score, each judge on the D Panel independently reaches his/her Difficulty Score and then the two compare and reach a consensus.

Each judge on the E Panel independently determines his/her score. The highest and lowest scores are dropped, and the gymnast's execution score is the average of the remaining four judges' scores.

6. For a gymnast's execution score, the six judges came up with these values;

8.4 8.2 8.8 7.6 8.0 7.8

What would those judges' combined score become? Please show your work.

7. In the 2008 Olympics, Chinese gymnast He Kexin received a D score of 7.7 and an E score of 9.025. Her final score was 16.725 and she won the gold medal for her uneven parallel bars routine. What could her performance have consisted of?

8. What do you think is the highest score that a gymnast could receive with this new scoring? Please explain your reasoning.

9. Do a little research about the highest score any gymnast has received and what might be humanly possible.

On July 8th and 10th, American gymnasts will compete in San Jose, California to determine which 5 gymnasts will represent the United States at the Rio Olympics.

Following is the schedule of Olympic competitions that will begin in Rio on August 7, 2016.

Artistic Gymnastics

Q Qualification F Final

Event↓/Date →	Sat 8/6	Sun 8/7	Mon 8/8	Tue 8/9	Wed 8/10	Thur 8/11	Sun 8/14	Mon 8/15	Tue 8/16
Women's individual all-around						F			
Women's team all-around				F					
Women's vault		Q					F		
Women's balance beam								F	
Women's uneven bars							F		
Women's floor									F

These are some of the contestants trying out now in California for the USA team:

Simone Biles - Born in Ohio in 1997. She won her first U.S. and world all-around titles in 2013. In 2015, she claimed a record third straight world all-around title. She discovered her talent when she visited a gymnastics center on a field trip with her day care group. The coach at the center saw her imitating the gymnasts and asked for her to be able to join the group as soon as possible. Favorite school subject: History.

Gabby Douglas - Gabrielle Douglas "the Flying Squirrel," was born in 1995, in Virginia Beach, Virginia. At the age of 3, she perfected a straight cartwheel using a technique that she learned from her older sister, Arielle, a former gymnast. By age 4, Douglas had taught herself how to do a one-handed cartwheel. She began formal gymnastics training when she was 6 years old and won a state championship by the time she was 8. In 2010, she moved away from her hometown and family to pursue training with an Olympic trainer and was selected to compete with the U.S. Olympic women's gymnastics team at the 2012 Summer Olympics. There, Douglas won gold in the individual all-around event and the US team event.

Brenna Dowell - Born in 1996 in Odessa, MO - Favorite school subject: **Math**.

Rachel Gowey - Born in 1997 in Urbandale, IA - 2015 Pan American Games team & uneven bars champion, Favorite school subject: **Science**.

Laurie Hernandez - Born in 2000 in Old Bridge, NJ - 2016 USA Bronze medalist in all-around, floor, balance beam, and uneven bars. Favorite school subject: **Science and Art**.

Amelia Hundley - born in 1998 in Hamilton, OH - 2015 Pan American Games team champion, silver medalist floor exercise. Bronze medalist on uneven bars. Favorite school subject: **Math**.

Madison Kocian - born in 1997 in Dallas, TX - Madi is an uneven bars medalist in 2014, 2015, and 2016. Favorite school subject: **Math and science**.

Ashton Locklear - Born in Lumberton, NC - Champion on uneven bars in 2014 and 2016. Favorite school subject: **Math**.

Maggie Nichols - Medalist in 2014, 2015 and 2016 in all-around, floor, and uneven bars. Favorite school subject: **Math**.

Aly Raisman - Born in 1994, and began winning gold in the vault event at the 2009 American Classic. She again won Gold in all-around category at the 2011 CoverGirl Classic. She helped the U.S. gymnastics team win the 2011 World Championships. At the 2012 London Olympics, she won two gold medals—one in the gymnastics team competition and the other in the individual floor exercise. She also won a bronze medal for the beam. Favorite school subject: English.

Emily Schild - Born in 1998 in Ft. Wayne, IN. Hometown: Huntersville, NC - Emily's favorite event is vault. Favorite school subject: **Math**.

MyKayla Skinner - Born in 1996 in Gilbert, AZ. Medalist in 2012-2016 in vault and floor. Favorite school subject: English.

Ragan Smith - Born in 2000 in Snellville, GA. 2016 balance beam champion. Favorite school subject: **Math**.



Sources: <http://www.nbcolympics.com/gymnastics/about-this-sport/scoring/news=scoring-overview.html>
http://www.nytimes.com/ref/sports/olympics/20080804_GYMNASTICS_GRAPHIC.html
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<https://usagym.org/pages/athletes/womenList.html>

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