

5th IYNT 2017: Captain's Contest for Science Fight 4

Captains are invited to the stage. Chairperson gives out the sheets with five problems and reads the tasks aloud. The winner is determined by the maximum number of correct answers. In case of a tie, an extra Problem 6 is offered. The sheets with answers and names of Captains are then submitted to the Scoring Commission for archiving. All scores and the winner are recorded in Science Fight Protocol.

1. Name the process that plants use to convert light energy into chemical energy.

Answer: Photosynthesis

2. Name the species of the largest and heaviest rodent in the World.

Answer: Capybara (*Hydrochoerus hydrochaeris*)

3. Dry copper sulfate (CuSO_4) is a white powder. However, when dissolved in water, it changes color drastically. What is the color of copper sulfate solution?

Answer: Blue, since it forms a complex $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

4. What is the molecular mass of sulfuric acid (H_2SO_4) in atomic units?

Answer: 98

5. Name the ingredient that is blended with fuel in a carburetor.

Answer: Air

To break the tie between two or three Captains in case of equal results, an extra Problem 6 is offered and the Captain with the closest result in Problem 6 is declared winner.

6. Pour an exact amount of 100 mL into a beaker without using any measurement tools.

5th IYNT 2017: Captain's Contest for Semi-Finals

Captains are invited to the stage. Chairperson gives out the sheets with five problems and reads the tasks aloud. The winner is determined by the maximum number of correct answers. In case of a tie, an extra Problem 6 is offered. The sheets with answers and names of Captains are then submitted to the Scoring Commission for archiving. All scores and the winner are recorded in Science Fight Protocol.

1. In computers, all information is represented by strings of either a 0 or 1. In DNA, genetic information is represented by strings of nucleotides. How many different nucleotides are there in DNA?

Answer: 4: cytosine (C), guanine (G), adenine (A), thymine (T). Naming them all is not necessary, just the number

2. If you throw a ball at constant initial speed, but at varying launch angle with respect to the horizontal, at what angle would it fly the farthest?

Answer: 45 degrees or $\pi/4$ radians

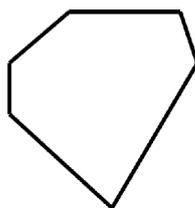
3. Water is known to expand or contract a little as temperature is varied, while atmospheric pressure is kept constant. At what temperature does liquid water have the highest density?

Answer: about 3.98 °C or ~277 K

4. Kakadu plum (*Terminalia ferdinandiana*) and Camu Camu (*Myrciaria dubia*) have the highest concentration of this vitamin among all known fruits.

Answer: Vitamin C

5. What is the sum of interior angles of the irregular hexagon shown in the figure?



Answer: For any convex polygon, the interior angle sum is $(n-2)\times 180^\circ$ or $(n-2)\pi$ radians, so for a hexagon it's 720° or 4π radians

To break the tie between two or three Captains in case of equal results, an extra Problem 6 is offered and the Captain with the closest result in Problem 6 is declared winner.

6. The city of Nanjing is famous for a special kind of stones called Yuhua stones. The captains are presented with a bowl of stones. Each captain needs to reach into the bowl with a hand and grab 20 stones without counting. The captain who grabs closest to 20 stones wins.

After the winner is determined, all captains who participated in the tiebreaker get to keep the stones as a souvenir.

5th IYNT 2017: Captain's Contest for the Final

Captains are invited to the stage. Chairperson gives out the sheets with five problems and reads the tasks aloud. The winner is determined by the maximum number of correct answers. In case of a tie, an extra Problem 6 is offered. The sheets with answers and names of Captains are then submitted to the Scoring Commission for archiving. All scores and the winner are recorded in Science Fight Protocol.

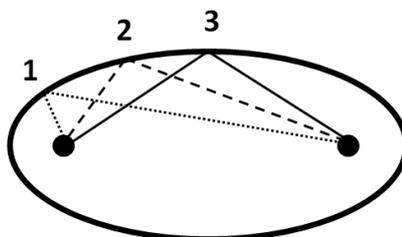
1. What is the formal Latin name of biological species to which you and your fellow Captains do belong?

Answer: *H. Sapiens* or *Homo Sapiens*. Using *Homo Sapiens Sapiens* is also correct

2. Name all the elements that are liquids at standard temperature and pressure.

Answer: bromine (Br) and mercury (Hg)

3. The Figure shows three paths connecting the focal points of an ellipse. Which path is the shortest, if any?



Answer: All three paths have exactly the same length by ellipse property

4. Name the smallest three-digit prime number.

Answer: 101

5. Arrange these metals in the order of increasing density: osmium, lithium, aluminum, lead.

Answer: lithium-aluminum-lead-osmium

To break the tie between two or three Captains in case of equal results, an extra Problem 6 is offered and the Captain with the closest result in Problem 6 is declared winner.

6. The city of Nanjing is famous for a special kind of stones called Yuhua stones. Put 20 stones on the table. The captains take turns grabbing stones from the table. With each turn one can grab 1, 2 or 3 stones (no more, no less). The captain who picks the last stone loses the tiebreaker. In case of a three-way tiebreaker, the losing captain is eliminated and the remaining two play the game again.

After the winner is determined, all captains who participated in the tiebreaker get to keep the stones as a souvenir.