

Math and Physics Contest «Phystech School 2020»

Problem Set 1 – recommended for grades 5 and 6

1. (2 points) The Genie told Aladdin: “I made a number which is 2 times less than a third of 84. What number did I make? If you answer, I will fulfill your every desire.” Help Aladdin – find the number that the Genie made up!



2. (3 points) Along a straight street, 10 new lights were installed at the same distance from each other. The distance between the first and the third light is 150 m. How many kilometers is the first street light from the last street light?

3. (3 points) Dr. Watson has a closet where stories about his friend Sherlock Holmes are stored. There are 6 drawers in the closet, each contains the same number of stories. On the closet is a sign “11*” that indicates how many stories are inside. The last digit (*) got erased over time. Which digit(s) could this be?



4. (3 points) When Harry Potter started his first year at Hogwarts School, he had 3,500 galleons (gold coins) in his account at Gringotts Bank. Every year, goblins working in the bank added 5% of this amount to Harry's account. How many galleons can Harry withdraw in 7 years by the time he finishes his studies? Assume Harry didn't make any withdrawals over this period.

5. (3 points) The Amphibian Man lives in a pool 25 m long, 15 m wide and 5.5 m deep. Once a week, he flushes out old water in the pool and fills it with clean water. The Amphibian Man pays 20 pesos per cubic meter for clean water. How much money will he have to pay for water at the end of the month, after 4 pool fillings?

6. (6 points) Tom and Jerry are walking towards each other at equal speeds along a straight road. Initially, there was 300 m between them. When the distance between them was 100 m, Tom felt the smell of a mouse and ran towards Jerry with 3 times his original speed. Jerry saw the cat only when they were 60 meters away, and immediately started to run back to his hole, which is located at the beginning of his journey, with 2 times the original speed. Will Tom catch Jerry? If yes, how many meters from the hole will this happen? If not, write how many meters away Tom will be from the hole when Jerry reaches it.



7. (8 points) The city has a circular subway line. It has three stations: the University, the Museum and the Stadium. If you use this line, then a trip from the Museum to the Stadium through the University will take 3 times longer than not through the University. A trip from the University to the Stadium is two times shorter through the Museum than if you take a train in the opposite direction. Which way from the Museum to the University is shorter and by how many times: through the Stadium or not through it?

