

Red level



- (5 credits)** Mad Hatter wound his two clocks at noon and found that one clock began to lose 2 minutes every hour, and the second one began to gain 1 minute every hour. When Mad Hatter looked at his clocks again, he found that the second clock gained 1 hour in comparison with the first one. At what time did it happen?
- (7 credits)** Less than 100 passengers were traveling by train in the first coach. There were twice as many standing passengers as sitting ones. 4 percent of passengers got off at the next station. How many passengers remained in the coach?
- (8 credits)** Captain Marvel, Superman, Flash and Quicksilver competed in running. When asked who took what place, they gave the following answers: Captain Marvel: 'I was neither the first nor the last one to cross the finish line.' Superman: 'I wasn't the last one.' Flash: 'I was the first one.' Quicksilver: 'I was the last one.' Three of these answers are known to be true and one of them is false. Who was the first to cross the finish line? If Captain Marvel, enter 1, if Superman, enter 2, if Flash, enter 3, if Quicksilver, enter 4.
- (10 credits)** The bisectors of the angles C and D of the trapezoid ABCD split its base AB into three equal parts. Can the diagonal AC be 5 times longer than BD? If yes, enter 1, if no, enter 0.
- (10 credits)** Several friends threw a party at the bar. Every time a woman came in, all the men present drank a glass of absinthe in her honor, and when a man came in, all the women drank a glass of martini when greeting him. What is the minimum number of the participants of the party if the bartender (not a member of this company) served 154 glasses of the drinks to them all?
- (10 credits)** A calculator has two yellow buttons: '+2' and '-2' and two red buttons: 'x3' and '÷3' (the latter only works if a number on the screen is divisible by three.) It is forbidden to press the yellow buttons three times in a row. How many three-digit numbers can be obtained from the input value 2020?
- (10 credits)** Several different integers were written in the Professor Moriarty's notebook. Sherlock Holmes found that the product of the two largest of them was 420, and the product of the two smallest of them was half as much as the first one. What is the maximum possible number of such numbers in the notebook?
- (12 credits)** How is it possible to place the numbers 2, 3, 4, 7, 8, 9 into the empty boxes to get a correct equality (each digit can be used only once)? Arrange the numbers in the desired order as a single six-digit number in your answer. Specify the largest number of all the possible six-digit numbers.

$$1/(_ + _) + 5/(_ + _) + 6/(_ + _) = 1$$

- (13 credits)** The necromancer Vasya placed vertices of the convex hexagon ABCDEF with the sides $AB=BC=CD=2$ cm and $DE=EF=FA=11$ cm on a circumference. What is the radius of this circumference?
- (15 credits)** The road between Humpty-City and Dumpty-City goes first along the plain and then along the hillside. The White Knight began his travel from Humpty-City to Dumpty-City, and at the same time the Black Knight began his travel from Dumpty-City in the opposite direction. They met 4.9 km from Humpty-City and then rode on. When they reached their destination cities, they turned and rode back. Their second meeting took place 9.9 km from Humpty-City. Find the distance between the cities, if both knights ride at 15 km/hour along the plain, at 8 km/hour up the hill, and at 24 km/hour down the hill.