

## Topics: Math Battle

1. Compute: 
$$\frac{2^2 + 2^2}{2^{-2} + 2^{-2}} =$$
2. Solve equation: 
$$2025 - 2(2025 - 2(2025 - 2x)) = x$$
3. A traveler comes to an inn where he wants to stay for several days. The rate is 1 gram of gold per day. The traveler has a large gold bar and offers the innkeeper to pay for his stay by cutting a piece of appropriate weight from the bar.

*"No", says the innkeeper, "you never know what happens tomorrow. I want to be paid every day for that day's stay".*

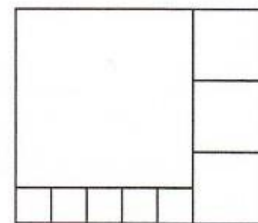
*"But this means that I have to cut you a one gram piece of gold every day", says the traveler. "It is a lot of trouble".*

*"Not necessarily", says the innkeeper. "I can use the piece you give me today to give you change tomorrow — so you do not really have to cut it into one gram pieces".*

What is the minimum number of gold pieces the traveler must cut if he stays at the inn one week? One month (31 days)? Can you carefully explain why the answer you suggested is indeed the minimum number possible?

4. Exactly one of the following statements is true. Which one?
  - a. Exactly one of these statements is false.
  - b. Exactly two of these statements are false.
  - c. Exactly three of these statements are false.
  - d. Exactly four of these statements are false.
  - e. Exactly five of these statements are false.

5. A rectangle to the right has been partitioned into 9 squares. The area of the medium square is  $100\text{m}^2$ . What is the area of the largest square?



6. There are two piles of candy, one with 18 candies and the other with 23. Two people are playing the following game: on his/hers turn, each player eats all candies from one pile and divides the other pile into two. The player who can't do this loses. Is it true that there is a winning strategy for one of the players? Which one?
7. Two girls are taking turns tearing the petals off a daisy flower. At each turn, you can tear off one or two petals (if tearing two, they must be next to each other). The girl who gets the last petal wins. The daisy has 20 petals. Can the first player always win? or the second one? or is it just a matter of luck?