Fresno Math Circle

Preview Problems

Grades 3-4

Name: _____

- The first six problems are from problem solving contests held as part of the Fresno Math Circle. We frequently do problems like these in our meetings. In addition, we work on our mental math skills, play various math games, and do fun hands-on group activities.
- Spend as much time as needed on these problems. Do not worry if you do not solve all problems. These problems are very challenging. They are meant for you to see if you enjoy the problems we do at the Fresno Math Circle. However, please do try your best.
- For each problem, explain how you solved it (and show your calculations), and write your answer in the answer box. Please provide good and clear explanations in full sentences. We would like to see your reasoning, not just a correct answer.
- Have fun! If you enjoy solving problems and puzzles like these, you will definitely enjoy participating in the Fresno Math Circle.
- Parents: please scan your child's solutions and send them to fresnomathcircle@gmail.com no later than one week after the application date. Your child's work will be reviewed along with the application form.

1. A grasshopper wants to climb a staircase with many steps. She makes only two kinds of jumps: 3 steps up or 4 steps down. Beginning at the ground level, at least how many jumps will she have to make in order to take a rest on the 22^{nd} step?

Answer:

2. Mrs. Winthrop went to a store, spent half of her money and then $10 more. She went to a second store, spent half of her remaining money and then $10 more. She then had no money left. How much money did she have to begin with when she went to the first store?

Answer:

3. Someone put their pet bunny down on a correctly solved problem. What number did it cover up?

$$193 \times 44 = \text{  } \times 193 + 2 \times 193$$

Answer:

4. Suppose you have a 3 inch by 3 inch by 3 inch cube. You paint the outside red, except the bottom and one of the sides. Then you cut the cubes into 27 pieces that are 1 inch by 1 inch by 1 inch. How many of the small cubes have exactly 2 red sides?

Answer:

5. Patricia has $12 more than Rhoda and $15 more than Sarah. Together, all three have $87. How much does Patricia have?

Answer:

6. In the addition problem below, there are three two digit numbers in which different letters represent different digits. What digits do A, B, and C represent?

$$\begin{array}{cccc} & & A & A \\ & & B & B \\ + & & C & C \\ \hline & A & B & C \end{array}$$

Answer:

7. This game is called Game 24. The goal is to make the quantity 24 using each of the following numbers exactly once and any operations and parentheses, in as many different ways as possible:

$$2, \quad 3, \quad 4, \quad 6.$$

For example, here is one way: $6 \times 3 + 2 + 4$.

Can you think of a few other ways to make 24 using these numbers?