GOLDEN KEY RUSSIAN SCHOOL Math Mosaic

HOMEWORK

Math Mosaic Circles

10/20/2019

Group "Kovalevskaya"

Name: _____

Please write your solutions and answers on a separate piece of paper. Also, please remember to bring your binder to every class!

Part I

1) How many numbers are in the following lists
   a) 2.5, 5.5, 8.5, … , 80.5, 83.5

   b) 6, 10, 14, … , 182, 186

   c) 6.3, 6.6, 6.9, … , 14.1, 14.4

2) How many 3-digit whole numbers are there? How about 4-digit numbers?

3) Chopping a cucumber into circular slices, how many cuts are required to get 10 pieces?

4) Paul is making a ruler. He places a long mark at every whole number, a medium mark every half-inch, and a tiny mark every quarter inch. How many marks will he need to make a standard 6-inch ruler?

5) How many even perfect squares are there from 100 to 10,000 inclusive?

6) How many whole numbers less than 100 are multiples of 3 but not multiples of 5?

7) A field in the shape of a regular hexagon is enclosed with a fence using 120 evenly spaced posts. Assuming there is a post at every vertex, how many posts are on each side of the hexagon?

8) a) Thirty people are standing in a circle. Each person shakes hands with the person on each side. How many total handshakes take place?

   b) Now the thirty people are standing in a line. How many handshakes are there?

9) In a classroom, 19 students have a brother, 15 students have a sister, 7 students have both a brother and sister, and 6 students don't have any siblings at all. How many students are in the classroom?

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10) How many distinct pairs of consecutive integers have a product less than 10,000?

Part II

Please complete the attached problems, 11-15, from the 2008 AMC8 competition.

Solution

Problem 11

Each of the 39 students in the eighth grade at Lincoln Middle School has one dog or one cat or both a dog and a cat. Twenty students have a dog and 26 students have a cat. How many students have both a dog and a cat?

$\textbf{(A)}\ 7 \qquad \textbf{(B)}\ 13 \qquad \textbf{(C)}\ 19 \qquad \textbf{(D)}\ 39 \qquad \textbf{(E)}\ 46$

Solution

Problem 12

A ball is dropped from a height of 3 meters. On its first bounce it rises to a height of 2 meters. It keeps falling and bouncing to $\frac{2}{3}$ of the height it reached in the previous bounce. On which bounce will it rise to a height less than 0.5 meters?

$\textbf{(A)}\ 3 \qquad \textbf{(B)}\ 4 \qquad \textbf{(C)}\ 5 \qquad \textbf{(D)}\ 6 \qquad \textbf{(E)}\ 7$

Solution

Problem 13

Mr. Harman needs to know the combined weight in pounds of three boxes he wants to mail. However, the only available scale is not accurate for weights less than 100 pounds or more than 150 pounds. So the boxes are weighed in pairs in every possible way. The results are 122, 125 and 127 pounds. What is the combined weight in pounds of the three boxes?

$\textbf{(A)}\ 160 \qquad \textbf{(B)}\ 170 \qquad \textbf{(C)}\ 187 \qquad \textbf{(D)}\ 195 \qquad \textbf{(E)}\ 354$

Solution

Problem 14

Three A's, three B's, and three C's are placed in the nine spaces so that each row and column contain one of each letter. If A is placed in the upper left corner, how many arrangements are possible?

A		

$\textbf{(A)}\ 2 \qquad \textbf{(B)}\ 3 \qquad \textbf{(C)}\ 4 \qquad \textbf{(D)}\ 5 \qquad \textbf{(E)}\ 6$

Solution

Problem 15

In Theresa's first 8 basketball games, she scored $7, 4, 3, 6, 8, 3, 1$ and 5 points. In her ninth game, she scored fewer than 10 points and her points-per-game average for the nine games was an integer. Similarly in her tenth game, she scored fewer than 10 points and her points-per-game average for the 10 games was also an integer. What is the product of the number of points she scored in the ninth and tenth games?

$\textbf{(A)}\ 35 \qquad \textbf{(B)}\ 40 \qquad \textbf{(C)}\ 48 \qquad \textbf{(D)}\ 56 \qquad \textbf{(E)}\ 72$

Solution