Po Leung Kuk

13th Primary Mathematics World Contest

Individual Contest 2010

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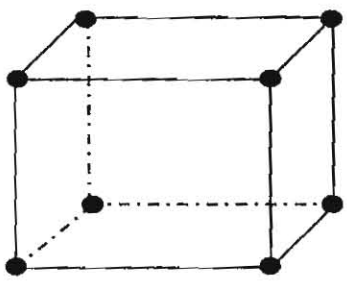
1. There are nine notes, including \$1, \$5, \$10 and \$50 notes. There is at least one of each denomination of the notes. Given that the total value of the nine notes is \$177, how many \$10 notes are there?

2. Eight numbers chosen from 1 to 9 are written on the vertex points of the cube shown below. Each number may only be used once. Only one number can be used for each point. Each face of the cube has four numbers. The sum of the four numbers in each face is 18. Which number cannot be used?



3. Andy, Billy, Clarence, and David said the following about a certain number:

Andy: "This number is 91."

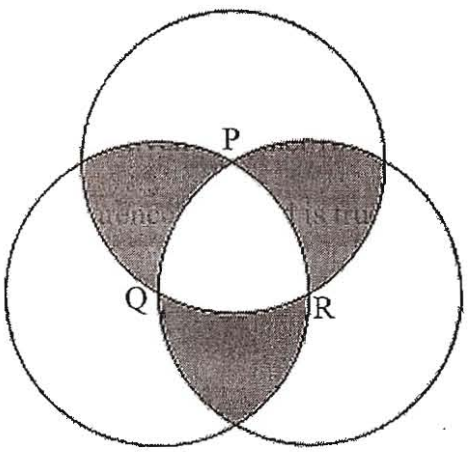
Billy: "This is a prime number."

Clarence: "This is an even number."

David: "This number is 87."

Only one statement given by either Billy or Andy is true. Only one statement given by either Clarence or David is true. What is the number?

4. P, Q and R are the centres of three identical circles. Find the area, in cm^2, of the shaded region given that the radius is 7 cm. (Take $\pi = \frac{22}{7}$)



5. Elvis has many identical pizzas. He gives $\frac{1}{3}$ of his pizzas plus $\frac{2}{3}$ of a pizza to Adam. He then gives $\frac{1}{4}$ of the remaining pizzas plus half a pizza to Benny. He gives half of the remaining pizzas to Clinton. Lastly, he gives half of the remaining pizzas plus half a pizza to Deon. In the end, Elvis is left with 5 pizzas. How many pizzas does Elvis have originally?

6. There are 21 identical juice bottles. 7 of them are full, 7 of them are empty and the rest of them are half full. Without changing the amount of juice in a bottle, divide these bottles into 3 groups of seven so that the total volume of the juice in each group is the same. What is the maximum possible number of half full bottles in a group?

7. Grandfather says to Ann: "My age is 7 times your age now. In a few years, my age will be 6 times your age. Subsequently, my age will be 5 times, 4 times and 3 times your age." If we know that the age of Grandfather is a two-digit integer and the age of Ann is an integer, how old is Grandfather now?

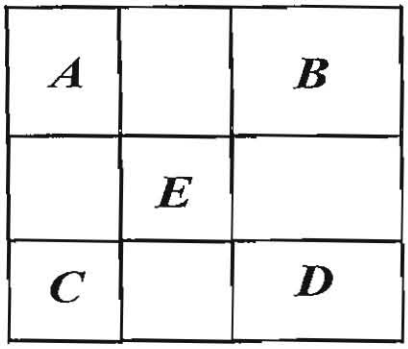
8. If the same 4-digit number is subtracted from 2010, 2000 and 1990, three different prime numbers will be obtained. What is the 4-digit number?

9. In a math test, there are 25 problems. Each correct answer earns 4 points and 1 point is deducted for each incorrect answer. Zero points are given for not answering a problem. Joko gets 68 points. Given that Joko answered at least one problem incorrectly, how many problems did he answer incorrectly?

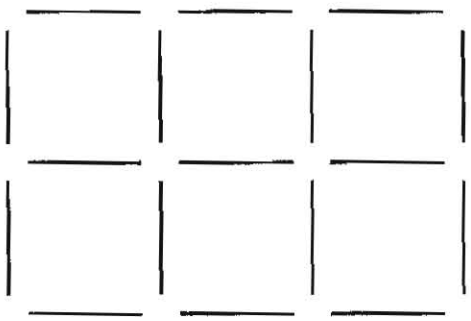
10. There are two brothers. The younger brother is between 30 and 40 years of age and the other is between 40 and 50 years of age. The product of their ages is a perfect cube. Find the sum of their ages.

11. Each term in the sequence 1, 2, 3, 5, 7, 9, 10, 11, 13, 14, 15, ... is a positive integer not divisible by 4 or 6. What is the 2010^{th} term of this sequence?

12. A square is partitioned into 9 rectangles as shown in the diagram below. Rectangle ***E*** is also a square. Given that the areas of rectangles ***A***, ***B*** and ***C*** are 7 cm^2, 21 cm^2 and 2 cm^2 respectively, find the perimeter of the rectangle labeled ***D***.

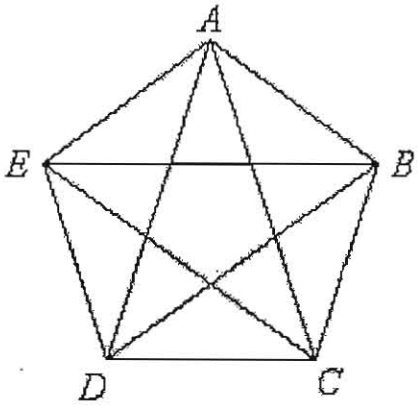


13. The rectangle below consists of 6 unit squares formed by using 17 identical sticks. Each side of a unit square is formed by one stick.



Find the greatest number of unit squares in a rectangle that can be formed by using exactly 500 identical sticks.

14. How many triangles of any size are in the picture below?



15. Figure A shows the beginnings of a pyramid made out of 14 solid cubic blocks of stone, each 1m on a side. Additional stone material will be added to form a smooth-faced pyramid as shown in Figure B. How many cubic meters of stone material should be added to the original 14 m^3 to get the smallest right pyramid in Figure B? (Hint: The volume of pyramid = Base area $\times$ height $\times\frac{1}{3}$)

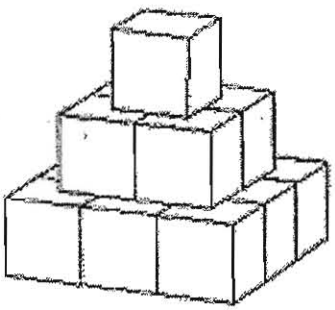


Figure A

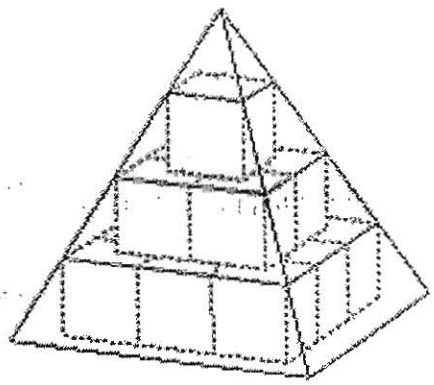


Figure B