

THE ASSOCIATION OF MATHEMATICS TEACHERS OF INDIA
GAUSS CONTEST – FINAL – PRIMARY

Classes V & VI

Saturday, 22nd October, 2016

Instructions:

1. Answer as many questions as possible.
2. Elegant and novel solutions will get extra credits.
3. Diagrams and explanations should be given wherever necessary.
4. Fill in FACE SLIP and your rough working should be in the answer book.
5. Maximum time allowed is THREE hours.
6. All questions carry equal marks.

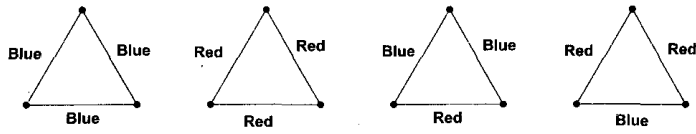
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1. (a) i. In how many ways can two identical balls be placed in 3 different boxes so that exactly one box is empty?
ii. In how many ways can three identical balls be placed in 2 different boxes so that exactly one box is empty?
iii. In how many ways can four identical balls be placed in 2 different boxes so that exactly one box is empty?
(b) A positive integer n has five digits. N is the six digit number obtained by adjoining 2 as the leftmost digit of n . M is the six digit number by adjoining 2 at the right most digit of n . If $M = 3N$, find all the values of n .
 2. (a) 1800 is expressed as $2^a \times 3^b \times 5^c$ and 1620 is expressed as $2^d \times 3^e \times 5^f$, where a, b, c, d, e, f are positive integers. Find the remainder when 2016 is divided by $a + b + c + d + e + f$.
(b) Three persons A, B, C whose salaries together amount to Rs 14,400, spend 80%, 85% and 75% of their respective salaries. If their savings are as 8 : 9 : 20, find their individual salaries.
 3. Completely simplify the fraction

$$\frac{7}{5 - \frac{8}{3}} \div \frac{3 - \frac{2}{3 - \frac{3}{2}}}{4 - \frac{3}{2}} - \frac{5}{7} \text{ of } \left\{ \frac{1}{1\frac{3}{7}} + \frac{6}{5} \text{ of } \frac{3\frac{1}{3} - 2\frac{1}{2}}{\frac{47}{21} - 2} \right\}$$

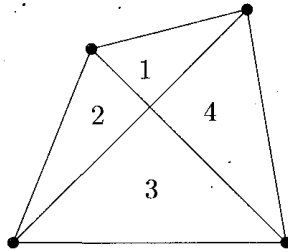
By $\frac{x}{y}$ of $\frac{a}{b}$ we mean $\frac{x}{y} \times \frac{a}{b}$.

4. p, q, r are prime numbers and r is a single digit number. If $pq + r = 1993$, find $p + q + r$.
5. (a) If we have sticks of the same color and same length, we can make one triangle using them. If we have sticks of same length but two different colors, say blue and red, we can make 4 triangles as shown below.

(b) How many triangles can be formed using sticks of same length but three different colors, say Red, Blue and Green?



- (b) The diagonals of a quadrilateral divide the quadrilateral into four regions. Draw a pentagon and find the maximum number of regions that can be obtained by drawing line segments connecting any two of its vertices.



Winners
are not people who
never fail,
but people who
never
quit