PRACTICE TEAM ROUND

NEW HAMPSHIRE STATE TEAM
NATIONAL MATHCOUNTS PREPARATION

(1) A class of 30 students is taking a 5 question multiple choice quiz (with 4 choices per problem) where correct answers are worth 6 points and incorrect answers are worth -1 points. If all of the students guess randomly on all of the questions what is the expected value of the sum of the scores of the students?

(2) 6000 apples were harvested but every third apples was too small, every fourth apple was too green, and every tenth apple was bruised while the rest were fine. How many fine apples remained?

(3) How many misspellings (rearrangements) of MISSPELL have no adjacent vowels?

(4) Point A has coordinates (3,11) and point B has coordinates $(18, 1)$. Point P is on $\overline{AB}$ The ratio of $AP : PB$ is 2:3. Find the sum of the coordinates of point P.

(5) In how many ways can non–overlapping 1×2 dominoes be used to cover a 2×8 board.

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(6) Two different numbers are selected at random from the set of integers greater than 0 and less than 15. Find the probability that they have no common prime factor.

(7) What is the sum of the integers n that are less than 100 such that n and $n+1$ both have 6 factors.

(8) Square $ABCD$ has area 64 square units. M and N are the midpoints of sides AB and DA respectively. Find the difference in the areas of the largest circle which can be drawn in the pentagon $BCDNM$ and the largest circle that can be drawn in triangle AMN.

(9) The workers in a factory produce widgets and whoosits. For each product, production time is constant and identical for all workers, but not necessarily equal for the two products. In one hour, 100 workers can produce 300 widgets and 200 whoosits. In two hours, 60 workers can produce 240 widgets and 300 whoosits. In three hours, 50 workers can produce 150 widgets and m whoosits. Find m.

(10) The graph of the equation $9x+223y = 2007$ is drawn on graph paper with each square representing one unit in each direction. How many of the 1 by 1 graph paper squares have interiors lying entirely below the graph and entirely in the first quadrant?