Each person on a 3-person Relay team receives a different math problem. The 1st person solves the problem and passes back the answer to the 2nd person. The answer is nearly always a number. It can be any type of number including irrational and complex numbers. Eventually, the 2nd person passes back an answer to the 3rd person. The 3rd person solves a problem and turns in an answer. ONLY the 3rd and final answer counts for points! The team receives more points for a correct answer after 3 minutes than a correct answer after 6 minutes.

The first expression in the problems for the 2nd person and the 3rd person will be:

\[ T = \text{TNYWR or “The Number You Will Receive”} \]

The variable T will appear in each problem for the 2nd and 3rd person. Usually the 2nd and 3rd students can make LOTS of progress solving the problem before receiving T from the student in front of them. Usually, the 2nd and 3rd person will be able to write their answers as a formula in terms of T. For example: \( x = (T + 5)/8 \). When T “arrives”, substitute and pass back the numerical answer. In this example, if \( T = 7 \), pass back 3/2.

1-1 A 9 by 9 by 4 rectangular box is constructed from \( 9 \times 9 \times 4 = 324 \) unit cubes.

All six faces of the box are painted red. How many of the original 324 unit cubes have exactly 2 faces painted red?

1-2 \( T = \text{TNYWR} \) Javon buys a bag of Jelly beans on Saturday morning. Javon eats 20% of the jelly beans on Saturday and eats 20% of the remaining jelly beans on Sunday. At the end of Sunday, there are T jelly beans left. How many jelly beans did Javon purchase Saturday morning?

1-3 \( T = \text{TNYWR} \) The area of this shape is 4T square centimeters.

Assume that all corners are right angles. Compute x.
ANSWERS

1-1. 64. The cubes on each edge, which are not a corner cube, have exactly two faces painted red. Eight edges have length 9, each contributes 7 cubes with two red faces. Four edges have length 4, each contributes 2 such cubes. $8 \times 7 + 4 \times 2 = 64$

1-2. 100. Let $N$ equal the original number of jelly beans. On each day, 80% or $4/5$ are not eaten. $N \times \frac{4}{5} \times \frac{4}{5} = T$. Therefore, $N = 25/16 \times T$. Since $T = 64$, $N = 25/16 \times 64 = 100$.

1-3 4. Area = $4T = (10+12) \times 20 - 10x; \quad 4T = 440 - 10x; \quad 10x = 440 - 4T; \quad x = (440 - 4T)/10 = (440 - 400)/10 = 4$