

NYMT Individual Questions - practice 02-06-15

Round 1

I1. Sally and Tommy did 20 assignments each, and received a grade from 2 to 5 for each assignment. Tommy got as many 5's as Sally got 4's, as many 4's as Sally got 3's, as many 3's as Sally got 2's, and as many 2's as Sally got 5's. The average grade was the same. How many 5's did Sally get?

I2. If a, b and c are the roots of $3x^3 - 3kx^2 + 3x + 2 = 0$, where k is a real number, and if

$$a^3 + b^3 + c^3 = 0,$$

find all real k .

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Round 2

I3. Let $x = (3 - \sqrt{5}) / 2$. Compute the exact value of $x^4 + 1 / x^4$.

I4. Compute the greatest possible radius of a semicircle contained entirely within a triangle with sides 13, 14 and 15.