

GSU MATH TOURNAMENT--JUNIOR VARSITY CIPHERING--2001

Round 1

1. Perform the indicated operations and leave your answer as a fraction in lowest terms: $\frac{2}{5} + \frac{5}{7} + \frac{1}{14}$
2. Perform the indicated operations: $35 + 12 \times 12 \div 2$
3. Perform the indicated operation and leave your answer as a radical in simplest form: $\sqrt{18} - \sqrt{8}$
4. Simplify the following expression leaving no negative exponents: $(2x^3)(5x)^{-2}$
5. Find the slope of the line perpendicular to the line given by the equation $x + y = 1$.
6. The length and width of a rectangle are in the ratio 3:4. If the perimeter is 70, find the length and width of the rectangle.
7. If John bicycles at an average rate of 0.75 miles per minute, how many hours will it take him to go 45 miles.
8. If $\log_b(xy) = 1$ and $\log_b(x/y) = 5$, what is $\log_b x$?

Round 2

1. A suitcase has a volume of 960. What is its width if the length is 12 and the height is 10?
2. 432 square inches is equivalent to what number of square feet?
3. Find the slope of the line given by the equation $4x + 3y + 24 = 0$.
4. Perform the indicated operations: $3^3 + 2(8 - 3 \cdot 2)$
5. Romeo is standing 20 feet away from the wall below Juliet's balcony during a school play. Juliet is on the balcony, 12 feet above the ground. How many feet apart are Romeo and Juliet? Leave your answer as a simplified radical.
6. Evaluate and leave your answer as a fraction in lowest terms:
$$\frac{1}{1 + \frac{1}{1 + \frac{1}{2}}}$$
7. Divide and leave your answer in reduced $a + bi$ form: $\frac{3 - i}{3 + i}$
8. How many subsets does the set $S = \{2, 3, 5\}$ have?

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1. $\frac{83}{70}$ or $\frac{13}{70}$
2. 107
3. $\sqrt{2}$ or $1\sqrt{2}$
4. $\frac{2x}{25}$ or $\frac{2}{25}x$
5. 1 or $\frac{1}{1}$
6. 15 and 20 or 15 by 20 or 15×20 (order of numbers doesn't matter)
7. 1 or 1 hour
8. 3

Round 2

1. 8
2. 3 or 3 sq. ft.
3. $\frac{-4}{3}$
4. 31
5. $4\sqrt{34}$ or $4\sqrt{34}$ ft.
6. $\frac{3}{5}$
7. $\frac{4}{5} - \frac{3}{5}i$ or $\frac{4-3i}{5}$
8. 8

