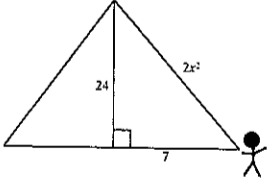


Pre-Algebra Ciphering
2011 VHHS Math Tournament

- 1-1 Betsy Ross's flag was originally a square with side length 7 feet. The flag's area now is 100 square feet. If all side lengths were increased by the same length, by how many feet were the original side lengths increased? 3
- 1-2 What is the least number of primes, not necessarily different, that 3185 must be multiplied by so that the product is a perfect cube? 5
- 1-3 Convert 139 to base 4. 2023
- 1-4 There are 24 ways for N people to stand in a line. What is the value of N ? 4
- 1-5 If $\sqrt{169} = \sqrt{16} + \sqrt{x}$, what is the value of x ? 81
- 2-1 Find the units digit of 2137^{754} . 9
- 2-2 Find the sum of the numerator and denominator when $0.\overline{256}$ is written as a fraction in lowest terms. 622
- 2-3 Find the value of x , written as an improper fraction, so that $\frac{[(6 \cdot 4) - 13]^2 - 1}{[\sqrt{(17 + 3)^2 - 14}]^3} = x + 3$. $-\frac{22}{9}$
- 2-4 The quotient of two consecutive positive integers is 1.05. What is the product of these two integers? 420
- 2-5 Evaluate $\sqrt{\sqrt{81 \times 81 \times 81 \times 81}}$. 81
- 3-1 If the Cramer's Crossing Matrix Masters team won three trophies in 2005, nine trophies in 2006, 27 trophies in 2007, and the pattern continues indefinitely, how many trophies will they win in 2012? 6561
- 3-2 If W = the number of diagonals in a hexagon and X = the number of diagonals in an octagon, find the value of $\frac{W + X}{W - X}$. $-\frac{29}{11}$
- 3-3 Factor completely: $15t^3 + 13t^2 - 6t$. $t(3t - 1)(5t + 6)$
- 3-4 How many $2 \times 2 \times 2$ cubes will fit into an $8 \times 8 \times 8$ cube? 64
- 3-5 If Bob needs to climb up the mountain along the path marked $2x^2$, how fast must he go if he must reach the summit in exactly five hours? All distances are measured in miles.  5 mph
- 4-1 Beginning with page 1, a printer used 1008 digits to number the pages of a book. How many pages are in the book? 372
- 4-2 Ziqi and Kelly are walking down Park Avenue. If the number of couples they meet is a function of the time they walk, how many couples would they meet after 30 minutes if the function is $f(t) = \frac{4t^2 + 12t + 8}{t}$, where t represents time, measured in hours? 30
- 4-3 At Gene's Great Groceries, Gene sells oranges for 75 cents each, apples for 50 cents each, and watermelons for \$3 each. Gene decides he wants a new pair of shoes, so he increases his prices by 30%. After he buys his shoes, he decreases the prices by 15%. What percent of the original prices are the new prices? 110.5%
- 4-4 Find the base-8 sum of $5167_8 + 2130_8$. 7317
- 4-5 How many integers between 100 and 200 are divisible by 3? 33