

Nassau County Interscholastic Mathematics League

Contest # 1

Answers must be in simplest exact form, unless otherwise noted.

2003-2004

No Calculators

Problems 1-2 Time limit: 10 minutes.

- 1) Sammy has some baseball bats. If they are separated into groups of three, there is one left over. If they are separated into groups of 5 or groups of 7, there are two left over. Find the smallest possible number of baseball bats that Sammy can have.
- 2) The sides of a triangle are 17, 17, and 16. Find the length of the longest altitude of the triangle.
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Problems 3-4 Time limit: 10 minutes.

- 3) If a card is randomly selected from an ordinary deck of cards, find the probability that it is a spade or an ace.
- 4) Consider the function $f(x) = 3^{cx}$. Find c if $f(9) = 27$.
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Problems 5-6 Time limit: 10 minutes.

- 5) Find all real x for which $\frac{4}{x} > 2$.
- 6) Barry, Bob, Bill and Bruce are each involved in exactly one of the sports: baseball, tennis, hockey, or the 100 meter dash in track. We know that:
- (1) Barry and the tennis player watched the runner run;
 - (2) Bill's sport does not involve a spherical object;
 - (3) the hockey player watched Bill and Bruce compete;
 - (4) Bob and the tennis player cheered for the hockey player;
- Determine who does which sport.
Give as your answer the ordered list (Barry's sport, Bob's sport, Bill's sport, Bruce's sport).
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Answers.

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| 1) 37 | 2) 15 |
| 3) $\frac{4}{13}$ | 4) $\frac{1}{3}$ |
| 5) $0 < x < 2$ | 6) (Hockey, baseball, track (or 100 m dash), tennis) |