

Lehigh University High School Math Contest

March 2, 2019

1. Do not open this exam until you are told to do so.
2. Print your name clearly on your answer sheet. On the “Grade” line, write your grade in school (5, 6, 7, 8, 9, 10, 11, or 12), **not** the grade level of your team. Also, circle M or F to indicate your gender. Phone number and e-mail addresses are requested primarily to contact top finishers about being on the Lehigh Valley team in the American Regions Math League. If you would not consider being on this team, you may leave those blank. **Please print these, especially e-mail address, legibly.**
3. Print clearly and legibly on the answer sheet your answer to each question. You should not write decimal approximations to numbers such as π and $\sqrt{2}$. Leave expressions such as π and $\sqrt{2}$ in your answer. You must simplify your answers as much as possible. For example, $6/4$ should be simplified to $3/2$, and square roots of integers should not appear in the denominator. Perfect squares should be removed from radicals. For example, $\sqrt{12}$ should be simplified to $2\sqrt{3}$. Trig functions of standard arguments should be evaluated. Frequently, several equivalent expressions will be considered correct. For example, $3/2$, $1\frac{1}{2}$, and 1.5 could each be correct.
4. If $x \geq 0$, then \sqrt{x} denotes the nonnegative square root of x . Also, AB denotes either a line segment or the length of a line segment. The vertices of a polygon, such as $ABCD$, are indicated in consecutive order as you move around the polygon. “Prime numbers” refer to nonfactorable positive integers greater than 1. Arguments of trigonometric functions are in radians. $[x]$ denotes the greatest integer $\leq x$.
5. Each correct answer is worth 1 point. A blank and an incorrect answer are each worth 0 points. An answer which is correct but not adequately simplified may receive half a point.
6. No books, notes, calculators, or electronic devices, such as cell phones, may be used. Turn off your cell phones.
7. You may keep your questions and scratch work. You might want to keep a record of your responses for comparison with the solutions, which will be distributed at 1:15 in various rooms. Your question sheet can also be used for a 25% discount at the University Center or Lamberton Hall.
8. The people with the ten highest scores out of all people taking the test, without regard for grade level, will receive cash awards of \$300, \$250, \$200, \$180, \$160, \$140, \$120, \$100, \$80, and \$60, respectively, compliments of Paul and Aarati Martino, Susquehanna International Group, and Mu Alpha Theta. In addition, there will be a \$100 prize for top girl. In case of ties, the person with fewer incorrect answers will be judged the higher finisher. The second tie-breaking criterion is number of correct answers on problems 31 to 40. The third tie-breaking criterion is number of correct answers on problems 21 to 30. If people are still tied, cash awards will be split.
9. A plaque will be awarded to the top individual and team-of-four in each grade level, 9-12, and one for top middle school individual.