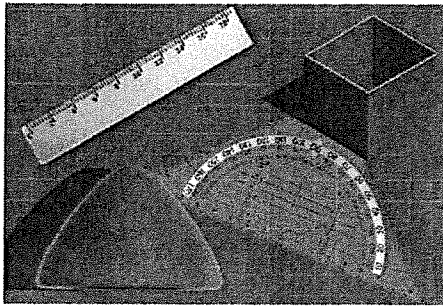


## INSTRUCTIONS FOR THE CONTESTANT

• **ENTRIES.** As many as THREE students in each grade level (2, 3, 4, 5, 6, 7 and 8) may be entered in the MATHEMATICS District Contest from each school.

• **ADVANCING TO STATE.** In grades 2 and 3, only ONE (1) student advances to State from each grade level. For grade levels 4, 5, 6, 7 and 8, 2 advance from each grade to State (See page 8 for complete rules. See page 107 for an abbreviated chart for contest administration.)

• **NATURE OF THE CONTEST.** The Mathematics contest tests the contestant's ability to solve a variety of mathematical problems studied at and above grade level. **All contest materials, including two #2 pencils (mechanical acceptable) and eraser, other than the test itself, must be supplied by the contestant.** No loose papers or other materials are allowed. Calculators are NOT permitted for use in the contest.



their grade levels and their contestant ID numbers in the spaces provided on the answer sheet. Contestants must not open the test until the start signal is given. No alarm watches or other devices that emit sound are allowed in the contest room. Disqualification will result if such device makes a sound while placed in any portion of the room. Contestants may use any white spaces on the test to assist in computing

answers. No additional paper will be provided.

**TIME ALLOTTED.** When the start signal is given, contestants will have 30 minutes to answer test questions. Contestants will remain quietly in their seats until the time has expired. The contest director will give a 5-minute warning when 5 minutes remain.

**MARKING ANSWERS.** Contestants may write on the test paper, but only the PRINTED CAPITAL letter answer should be written in the answer space on the answer sheet. Any marking in the answer space will constitute an attempt.

• **SCORING.** Add 5 points for each correct answer. Subtract 2 points for each incorrect answer, or for each answer that was attempted, marked through or erased, and did not result in a correct answer. **No points** are added or deducted for skipped or unanswered test items. • Mark-outs are acceptable, as long as a correct answer is written beside the mark-out. If an answer is marked out and no correct answer is written in the answer space, 2 points deducted. Erasures are permitted. **Any erased correct answer that can still be seen is counted correct.** An erased answer that is not correct and does not have a correct answer written over or beside it constitutes an incorrect answer, whereby 2 points are deducted.

• **VERIFICATION PERIOD.** (See page 14 for complete rules for Verification Period.)

• **MATERIALS.** Last year's PSIA Mathematics tests and answer keys, plus tests from previous PSIA contests, are included in the PSIA Academic Study Materials Booklets, which may be ordered from the PSIA office. A PSIA Study Materials Order Forms for these booklets are included in the appendix of this handbook.

Test structure:

- Grades 2 & 3: 40 questions (choices A-D)
- Grades 4 & 5: 40 questions (choices A-E\*)
- Grades 6 – 8: 50 questions (choices A-E\*)

\*Choice E is NOT for "none of these."

Test questions are similar to those found in state-adopted textbooks, but many items are usually tested at a higher grade level. For the grades 6-8 contest, approximately 25% of the problems will require knowledge of Algebra I computation skills. All tests will contain problems covering, but not limited to, numeration systems, arithmetic operations involving whole numbers, integers, fractions, decimals, exponents, order of operations, probability, statistics, number theory, simple interest, measurements (English and metric), and conversions normally covered (feet to inches, quarts to gallons, etc.). There will also be geometry problems normally covered in the middle school student's textbooks, including application of the Pythagorean theorem. Normal geometry problems will include finding area and volume of polygons/polyhedra and circles/spheres. Various types of problems are randomly distributed throughout the test. **The special topic for grades 6-8 during the 2024 through 2025 competition years is "Principles of Counting."** See website for more information.

• **WHAT HAPPENS IN THE CONTEST.** The contest director will announce the time and place that contestants and one adult should report for verification of the scoring of tests. (Substitutes taking the place of absent registered contestants should be sure to let the contest director know as they enter the room to save time at roll call.)

Answer sheets will be distributed to contestants first, followed by contestant ID-labeled tests distributed by student name. Contestants will be instructed to write

### Sample Problems -- Grades 2–3

1.  $82 - 26 =$   
A. 66      B. 56      C. 68      D. 58
2. How many dimes equal the same amount as 12 quarters?  
A. 35      B. 36      C. 24      D. 30
3. What number goes in the box to make the statement true?  
 $500 - \square = 400 - 128 - 64$   
A. 272      B. 312      C. 164      D. 292
4. How many different 4-letter codes can be made from the letters A, B, C, D, and E, using each letter at most once?  
A. 625      B. 24      C. 120      D. 60

- Jolie has 96 markers. She places them in bags with 8 markers per bag. How many bags does she need?  
A.  $96 \div 8$     B.  $96 - 8$     C.  $96 \times 8$     D.  $96 + 8$
- $19.86 - 14.7 =$   
A. 4.79    B. 5.79    C. 4.16    D. 5.16
- A bag has 9 red coins and 3 blue coins. One coin is drawn out. What is the probability of drawing out a blue coin?  
A.  $1/2$     B.  $1/3$     C.  $1/4$     D.  $1/6$

### Sample Problems -- Grades 4-5

- $2476 - 997 =$   
A. 1479    B. 1473    C. 1579    D. 1573    E. NOT
- $744 =$  \_\_\_\_\_ (Roman numerals)  
A. DCCXLIV    B. DCCLXIV  
C. MCCXLIV    D. MCCLXIV    E. NOT
- A piece of rope 5 yards 1 foot 9 inches long is cut from a rope 7 yards 2 feet 1 inch long. How long is the remaining rope?  
A. 2 yards 4 inches    B. 2 yards 2 inches  
C. 2 feet 4 inches    D. 2 feet 2 inches    E. NOT
- $(9 \times 10^{-2}) + (7 \times 10^{-3}) =$  \_\_\_\_\_ (decimal)  
A. 0.97    B. 0.907    C. 0.097    D. 0.0097    E. NOT
- How many vertices does the Platonic solid icosahedron have?  
A. 8    B. 12    C. 20    D. 30    E. NOT
- The letter P represents a single digit in the equation  $27 \times 16935301 = 457P53127$ . Find the value of P.  
A. 1    B. 2    C. 3    D. 4    E. NOT

- There are 12 red tiles, 18 yellow tiles, and 6 green tiles in a box. A single tile is drawn out. What is the probability of not getting a red tile?  
A.  $1/4$     B.  $3/4$     C.  $1/3$     D.  $2/3$     E. NOT

### Sample Problems -- Grades 6, 7 & 8

- What percent of 60 is 42?  
A. 75%    B. 70%    C.  $66 \frac{2}{3}\%$     D.  $62 \frac{1}{2}\%$     E. NOT
- What is the sum of the digits in the hundred thousandth's and millionth's places of 15.38704925?  
A. 4    B. 13    C. 11    D. 7    E. NOT
- If Q represents a single digit, what value of Q makes the number 4Q73 have a remainder of 7 when divided by 9?  
A. 2    B. 3    C. 4    D. 5    E. NOT
- How many positive integral divisors of 96 are also multiples of 4?  
A. 16    B. 6    C. 8    D. 12    E. NOT
- Which of the following is a factor of  $x^2 - 7x - 60$ ?  
A.  $x - 10$     B.  $x - 15$     C.  $x + 5$     D.  $x + 12$     E. NOT
- If  $3^{2x-1} = 27$ , then  $5^{x-1} =$   
A. 125    B. 25    C. 5    D.  $1/2$     E. NOT
- The area of a rectangle is 140 square meters. Its length is 1 meter shorter than triple its width. What is its perimeter?  
A. 54 m    B. 48 m    C. 60 m    D. 44 m    E. NOT

#### ANSWERS

- 2-3: 1. B    2. D    3. D    4. C    5. A    6. D    7. C  
 4-5: 1. A    2. A    3. A    4. C    5. B    6. B    7. D  
 6-8: 1. B    2. B    3. A    4. C    5. C    6. C    7. A

## 2023 MATHEMATICS 2024

### ADDITIONAL INFORMATION FOR COACHES / CONTEST DIRECTORS

• **PREPARATION FOR CONTEST.** Read and follow all instructions provided in the "Rules for All Participants" section of the *PSIA Academic Handbook*. Observe and practice with students all rules and procedures delineated in the "Instructions to the Contestant" and in the "Checklist for Contest Directors" and the "Checklist for Graders." Preparation for the MATHEMATICS Contest should include student practice in regular and advanced mathematics textbook studies, as indicated in the student information.

• **PERSONNEL NEEDED FOR CONTEST.**

1. *Contest Director.* May be a knowledgeable coach of contestants in the contest.

2. *Assistant Directors.* Two knowledgeable coaches from different schools other than director's.

3. *Graders.* Director and assistant director may also serve as graders. To expedite the grading process, provide at least two graders for every 15 papers.

• **SCORING (ADDITIONAL INFORMATION).**

Tests ranking in the top 10 should be scored by a third individual. Post all scores on the Contest Roster before ranking to the top 10.

