

• **PREPARATION FOR CONTEST.** Read and follow all instructions provided in the “Information Pertaining to All Contests” 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 Calculator Contest should include practice using a calculator that is familiar to contestants. Calculator tests from previous years of competition (available on PSIA order forms) provide multiple practice problems for students. No specific calculator is recommended; however, the list to the right should give coaches a starting point. Only ONE calculator will be allowed during testing.

• **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 7 to 8 papers.

• **SCORING (SUPPORT INFORMATION).**

+5 for each correct answer; –2 for each incorrect answer, and erased answer or marked-through answer that does not result in a correct answer. REMEMBER, contestants are NOT allowed to skip items on this test without a 2-point penalty for each skip. Graders should each use a different color pen or pencil to mark papers and place their initials at the bottom of the test answer sheet to indicate that they have graded the paper.

CALCULATOR SUGGESTION LIST

- Texas Instruments:
 * TI-84 (Plus Series)
 * TI-Nspire
 * TI 36x Pro
 * TI 83 Plus
 Hewlett Packard 35S
 * *Most used in State contest*

• **ENTRIES.** As many as THREE students from **combined** grade levels (grades 6, 7 & 8) may be entered in the Calculator Applications District Contest from each school. **Grade levels MAY be judged separately and additional entries may be allowed up to 3 per grade level at District, but only the top 2 places in combined grades 6, 7 & 8 will advance to State.**

• **ADVANCING TO STATE.** First and second place winners from the contest will advance to State. Third place winners will be alternates. See page 8 for more details. See page 110 for an abbreviated chart for contest administration.)

• **NATURE OF THE CONTEST.** The contest presents 80 problems in straight-forward numerical calculation problems, geometry problems, and word problems. Both accuracy and speed are factors in the competition. **ONLY one** silent, hand-held, tapeless calculator may be used and should be brought to contest. Geometric problems involve knowledge of formulas for simple figures such as circles, squares, rectangles, and right triangles and solids. Word problems require application of appropriate mathematical skills and practical knowledge to real-life situations.

• **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. Contestants will be assisted by the director and assistant(s) in clearing all calculator memories and turning calculators to the “off” position. The contest director will tell contestants their ID numbers, usually during roll call. Tests will be distributed to contestants face up, and contestants will be instructed to write their grade levels and their contestant ID numbers in the spaces provided on the front cover. Contestant must not open the test until the start signal is given. (Substitutes taking the place of absent registered contestants should let the contest director know as they enter the room to save time in roll call.) No alarm watches or other devices that emit sound are allowed in the contest room.

• **SAMPLE PROBLEMS.** Representative problems of medium difficulty (page 3 punch and word problems) are provided below. Sample geometry problems are shown above.

• **TIME ALLOTTED.** Contestants will have 30 minutes beginning at the start signal. No time warning will be given. Contestants will remain quietly in their seats until the time has expired.

• **MARKING ANSWERS.** Contestants may write on the test paper, but only the answer should be written in the answer space. Any marking or erasure in the answer space will constitute an attempt. Answers may be written in decimal or scientific notation of the form (1.23×10^{-6}) for example), **except** integer and dollar sign problems, answers should be written with three significant digits only, with plus or minus one digit error in the third significant digit permitted. Integer problems require answers written as an integer, and no error is permitted. Dollar sign problems should be answered to the exact cent, but plus or minus one cent error is permitted. Answers should be given in the units specified on the answer blank, if a unit is required, and with the correct sign. All test questions up through the last one attempted, including an erased attempt, will be scored.

• SCORING. Grade only through the last problem attempted by the contestant. A contestant attempts a problem when any mark (erased or not) is present in the answer space. Do not grade past the last attempted problem. Add 5 points for each correct answer. Subtract 2 points for each wrong answer, every skipped test question, and for each answer that was marked through or erased, without resulting in a correct answer. 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 beside the mark-out, 2 points are 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.

• ALTERNATE SCORING METHOD: Multiply the problem number of the last attempted problem by 5. Multiply the number of incorrect or skipped problems by 7. Subtract the first number by the second. This scoring method is equivalent.

• VERIFICATION PERIOD. See page 14.

• MATERIALS. Last year’s PSIA Calculator Applications tests and answer keys, plus tests from previous PSIA contests, are available on Study Materials Order Form and Tests Order Form found on the PSIA website.

A Commonly Asked Question

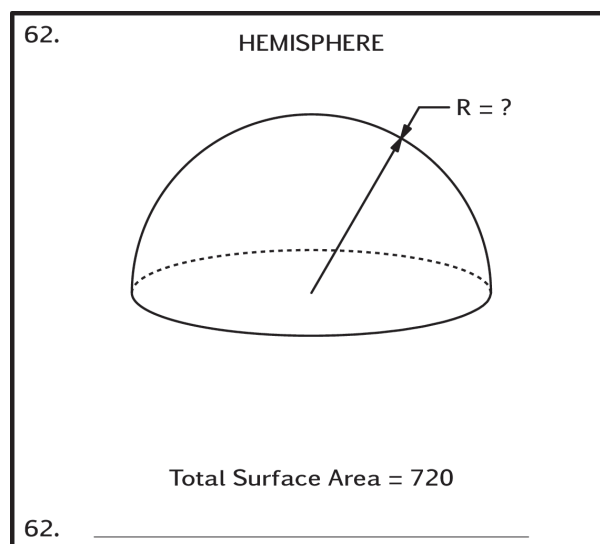
Q. If the answer to a question is 3.68×10^1 , would the answer be correct if it were given as 3.68×10 with the exponent ¹ omitted?

A. Yes. 3.68×10^1 , 3.68×10 and 36.8 are correct answers.

$3.68E1$, $3.68 \cdot 10^1$ and 36.8×10^0 are incorrect.

See "Grading the Calculator Applications Test" on the previous pages.

SAMPLE PROBLEMS



32: $\left[\frac{1/0.917}{0.0482 - 0.608 - 0.432} \right] - \left[\frac{0.0512 + \pi}{0.0898 / 3.05} \right]$ ----- 32=_____

33: $\frac{1}{(1.06 + 96.2 + 992)} \times \left[\frac{(788)(42.9 + 6.12 - 8.41)}{(-23.7)(684 + 96.6 - 74.2)} \right]$ ----- 33=_____

34: $\frac{1}{1/(-0.291)} (6.31 + 0.0132) + \{3.65 \times 10^1\}$ ----- 34=_____

35: A company estimated 18,300 toaster sales for the previous month. They actually sold 20,140 toasters. What is the percent error in the sales estimate? ---- 35=_____ %

36: Emerald had scored 84, 99, 92, and 94 on her first four quizzes. After her fifth quiz, her average was 93. What did she make on the fifth quiz? ----- 36=_____ (integer)

Grading the Calculator Applications Test

Punch Problems and Geometry Problems:

- Must use 3 significant digits
- Can use regular notation OR scientific notation
- Must be formatted in one of the following acceptable forms:
 12.3 , 123 , $123.$, 1.23×10^1 , 1.23×10 ,
 1.23×10^0 , 1.23×10^{01} , $.0190$, 0.0190 , 1.90×10^{-2}
- Cannot be in any of the following forms:

Incorrect Answer	Reason	Incorrect Answer	Reason
12.30	4 significant digits (0 is significant when behind the decimal point)	1.230×10^2	4 significant digits (0 is significant when behind the decimal point)
123.0	4 significant digits (0 is significant when behind the decimal point)	0.19	2 significant digits (0 is not significant before the first non-zero digit)
$1.23(10)^2$	Incorrect form for scientific notation	1.9×10^{-2}	2 significant digits
$1.23 \cdot 10^2$	Incorrect form for scientific notation (dot for multiplication is not permitted)	19.0×10^{-3}	Incorrect scientific notation form (Must be exactly one digit before the decimal point)
$1.23 * 10^2$	Incorrect form for scientific notation (star for multiplication is not permitted)	1.90E-02	Incorrect scientific notation form

- The third significant digit can be off by ± 1 . For example, if the correct answer is 48000, then both student responses of 47900 and 48100 would be counted correct.

Word Problems:

- All word problems follow the rules for Punch Problems and Geometry Problems except for Integer problems and Money Problems.
- Integer problems are denoted by “(integer)” in the answer blank. Answers must be exact integers and cannot be written in scientific notation. No error in the last digit is permitted. No decimals are permitted.
- Money problems with dollar signs must be accurate to the penny. These answers cannot be written in scientific notation. Students are allowed a \pm one cent error in their answers.

Practice

Determine which of the following answers are correct based on the answer key given.

Student Responses Punch Problems & Geometry Problems	Answer Key
....1: 8.44	1: 8.54 8.54×10 ⁰
....2: 56700	2: 56600 5.66×10 ⁴
....3: 3.982×10 ²	3: 398 3.98×10 ²
....4: 819×10 ⁵	4: 819000 8.19×10 ⁵
....5: 5.67 · 10 ⁻⁰³	5: 0.00567 5.67×10 ⁻³
Word Problems	
....6: 48392 (integer)	6: 48393 (integer)
....7: \$ 45.20	7: \$ 45.19
....8: 312900 gallons	8: 313000 3.13×10 ⁵

ANSWERS: 1. Wrong – off in the second significant digit. 2. Correct – off in third significant digit by 1. 3. Wrong – too many significant digits. 4. Wrong – no decimal point. 5. Wrong – dot notation not permitted. 6. Wrong – integers must be exact. 7. Correct – money problems with dollars can be off by one cent. 8. Wrong – too many significant digits