



# Calculator Applications Handbook

For Contest Directors, Coaches and Contestants

2024 • 2025

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# 2024 | 2025

## University Interscholastic League

### Calculator Applications Handbook

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The details in this handbook expand upon the information in the UIL Constitution & Contest Rules. In addition to this handbook, coaches, contestants and contest directors should read Sections 900-906 for information pertaining to all contests. See also the Academic Quick Reference Chart found at the end of this handbook and on the UIL website.

From the UIL Constitution & Contest Rules:

#### **Section 924: HIGH SCHOOL CALCULATOR APPLICATIONS CONTEST**

(a) **THE CONTEST.**

- (1) Purpose. The Calculator Applications Contest trains students in efficient problem solving strategies involving calculations in the areas of engineering, science and mathematics.
- (2) Format. The contest includes calculations involving addition, subtraction, multiplication, division, roots, powers, exponentiation, logarithms, trigonometric functions, inverse trigonometric functions, iterative solutions for transcendental equations, differential and integral calculus, elementary statistics and matrix algebra. In addition to straightforward calculation problems, the contest shall include geometric and stated problems similar to those found in recently adopted high school algebra, geometry, trigonometry, pre-calculus and calculus textbooks, previous contests, and UIL materials related to the contest.
- (3) Calculators. Refer to the contest handbook for restrictions on calculators.
- (4) Late Arrivals. Qualified contestants not present when the tests are distributed will be disqualified.

(b) **ENTRIES.**

- (1) Individual Competition. Each member high school may enter as many as six individuals in the district meet, which may be limited to a maximum of four individuals with district executive committee approval.
- (2) Team Competition. A school shall have a minimum of three contestants compete in order to participate in the team competition. All four members of the winning team will advance to the next higher level of competition.

(c) **QUALIFICATION.** Individuals, teams and wild cards qualify for the next level of competition according to Section 902.

(d) **TIES.**

- (1) Individual Competition. In the event of a tie, the higher place shall be given to the contestant gaining the most points on stated and geometric problems. If the same number of points are gained on stated and geometric problems, then a tie exists.
- (2) Team Competition. Refer to Section 902 (h)(3)(D).

# Calculator Applications

## Contest Rules and Procedures

1. **CONTEST ROSTER.** A contest roster listing contestants will be created from schools' online entries and provided to the contest director.
2. **NUMBERING CONTESTANTS.** Each contestant will be assigned a number. This number should be indicated on the contest roster and included on the contestant's test. Contestants shall not write their name or the name of their school on their tests.
3. **ROLL CALL.** The contest director will call roll from the contest roster and replace any contestant who is not present with a certified substitute at district or the certified alternate or team substitute at regional and state. All persons except participating contestants, the contest director, assistants and monitors will be dismissed from the room before the contest begins.
4. **SUBSTITUTIONS AND ALTERNATES.** Schools may replace individual contestants on the official district meet roster with a substitute so long as the substitute presents the contest director with the appropriate documentation. Alternates may compete at region and state only in the absence of an individual who won first, second or third place in the preceding competition. If a member of a school's team cannot compete at region or state, only one substitution may be made. See the UIL Constitution and Contest Rules Sections 903-905 for clarification.
5. **SEATING.** Contestants will be seated sparsely around the room and away from other contestants from the same school.
6. **LATE ARRIVAL.** Qualified contestants not present when the tests are distributed will not be admitted and are disqualified.
7. **CALCULATORS.** All commercially available calculators are permitted provided they are hand-held, can operate silently and do not require auxiliary electric power. Calculators that have gone off the market are permitted so long as they meet the other contest requirements.
  - a. Calculators may not be user-modified.
  - b. A maximum of two calculators will be permitted and may be used at any time during the contest.
  - c. Clearing of calculators is no longer required. Calculators will not be checked or verified respecting any information stored on them prior to the start of the contest.
8. **TEST DISTRIBUTION.** Testing materials will be distributed and contestants shall not open the test prior to instructions from the contest director. The assigned contestant number should be written in the top right-hand corner of the test cover page.
9. **SCRATCH PAPER.** Contest directors shall provide contestants with scratch paper, if requested. Contestants may write on the test and on the scratch paper provided.
10. **ANNOUNCEMENTS.** For district and regional contests, following roll call and prior to the start of the test, contest directors shall read aloud to contestants the section of this handbook titled Announcements Prior to Conducting the Contest.
11. **START AND STOP SIGNALS.** Contest directors will give the signal to start. After 30 minutes have expired, the contest director should give the verbal notification to stop. No other time warnings shall be given. When the end of the contest period is indicated, contestants shall cease calculator operations and may write down the number displayed on the calculator.
12. **TIMING AND ELECTRONIC DEVICES.** Contestants may use timing devices provided they do not emit audible signals during the contest. Cell phones, tablets, smart watches or any device that can wirelessly connect to the Internet, may not be used during the contest. Music players, headphones, etc. may not be used in the testing room. Electronic devices not allowed in the

contest should be turned off and should not be accessible during testing.

13. **ANSWERS.** Only the answer should be written in the answer space.
  - a. Contestants may erase or mark out an answer previously written, provided they write the revised answer within the answer space and clearly indicate the answer they wish graded.
  - b. Answers may be written in decimal or in powers of 10 notation of the form,  $1.23 \times 10^{-6}$ . Except in integer, dollar sign and certain stated problems, answers should be written with three significant digits only, with plus or minus one unit 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 in fixed notation, but plus or minus one cent error is permitted. Stated problems using inexact numbers require use of the method of least significant digits. Problems requiring the method of least significant digits are indicated by "SD" in the answer blank. Plus or minus one unit error in the last significant digit is permitted. The test cover sheet illustrates how answers should be written.
14. **LEGIBILITY.** If a consensus of graders cannot read an answer, they will mark that answer as incorrect. See Grading the Contest section for additional information.
15. **TURNING IN PAPERS.** Contestants shall remain seated and retain their papers during the 30-minute testing period. If a contestant leaves the room, testing materials shall be turned in before exiting, and the contestant may not re-enter. The contestant's test shall be graded, scored and ranked as submitted.
16. **GRADERS.** Coaches are expected to serve as graders and should be selected by the contest director prior to the beginning of the contest. One grader will be designated as the Head Grader.
17. **ANSWER KEY.** Prior to the start of grading, the Head Grader should communicate to the contest director any concerns of the graders and any suggested changes to the key.
18. **ANSWER KEY ERRORS.** In the case of a suspected error on the answer key, the contest director should contact the UIL State Office and/or contact the state contest director to communicate the suspected error and to seek clarification before changing the key. Any error confirmed by the UIL State Office or the state contest director should be corrected on the key used for grading.
19. **GRADING THE CONTEST.** Each paper should be independently scored twice, and papers contending to place should be scored a third or fourth time as needed.
20. **SCORING.** All problems through the last problem completed or attempted will be graded. A problem is considered to have been attempted if any mark or erasure appears in the answer space for that problem. Scoring is plus five points for correct answers and minus two points for incorrect, skipped, or illegible answers. Stated problems involving inexact numbers that are answered correctly but with the incorrect number of significant digits are awarded plus three points, provided at least two significant digits are indicated and the more precise answer rounds exactly to the lesser precise answer.
21. **PLACES AND TIES.** Contestants can qualify to the next level of competition as individual first, second and third place winners or members of the winning team or wild card team according to Section 902 of the UIL Constitution and Contest Rules.
  - a. Individual Competition. First place is awarded to the contestant making the highest total score, second place to the contestant making the next highest, third place to the next highest and so on. Ties shall be broken according to Section 924 of the UIL Constitution and Contest Rules.
  - b. Team Competition. First place is awarded to the team with the highest team score and second place to the team with the next highest. Team ties shall be broken according to Section 902 (h)(3)(D) of the UIL Constitution and Contest Rules. In district competition,

the top four scoring contestants from a school will constitute the school's team. At all levels, the sum of the top three overall scores from each school constitutes the team score for the school. All four members of first place or wild card teams advance to the next level of competition. All team members who qualify to regional or state will compete for individual honors.

- c. Wild Card. A wild card team will advance according to Section 902 of the UIL Constitution and Contest Rules.
22. **VERIFICATION PERIOD.** Following grading and input of unofficial results into the online entry system, contestants and coaches shall be allowed a time period to review contest materials (see After the Contest, Verification Period). Questions shall be resolved during the Verification Period. Contestants and coaches not present at verification waive their opportunity to ask questions and accept final results as official. The purpose of the verification period is to check accuracy in scoring, tabulation and data entry, not to challenge the test or answer key.
23. **ANNOUNCING OFFICIAL RESULTS.** Following the verification period, the contest director should announce, as official, the names and schools of contestants through sixth place and the top two teams. Official results, once announced, are final.
24. **NOTIFYING ALTERNATES.** If an individual qualifier or team cannot compete at the region or state meet, the alternate shall be notified and allowed to compete. It is the responsibility of the school scheduled to attend to notify the meet director and the alternates school in writing as soon as possible prior to the contest. Failure to do so could violate the Academic Contest Ethics Code.
25. **RETURNING THE PAPERS.** When results are final and all test questions resolved, district papers may be returned no sooner than the end of the last contest day of the district week. Regional papers may be returned no sooner than Saturday of region weekend.
26. **CONFIDENTIALITY.** Coaches, contest directors and contestants shall maintain confidentiality of contest material until the official release date. Transfer of information regarding test content shall be considered a violation of the Academic Contest Ethics Code and subject to penalties as outlined in the UIL Constitution and Contest Rules.
27. **SWEEPSTAKES POINTS.** Points are awarded through sixth place and to first and second place teams according to Section 902 of the UIL Constitution and Contest Rules.

# BEFORE THE CONTEST

## ROOM

Secure the best room you can find that is large enough for the number of contestants expected. It is very important to have a room with tables or desks with writing areas that are large, at least 18 x 24 inches. Using two rooms with suitable desks and conducting the contest simultaneously in both is preferable to using one unsuitable room.

## MATERIALS AND EQUIPMENT

The contest director will provide the following:

- Clean scratch paper for use by the contestants
- Pens for grading
- Accurate clock for timing, preferably one that contestants can see during the contest
- (DISTRICT) One 8 ½ x 11 envelope per school entered, for returning materials

Contestants should provide the following:

- Pens or pencils
- Calculators (see calculator restrictions)

## CONTEST PACKET

The League office will provide the following in the contest packet:

- A copy of the rules from the Calculator Applications Handbook
- Copies of the tests and answer keys

The meet director may schedule a specific time and place for contest directors to pick up the test packet before the contest. Contest officials should inventory the contents before the contest. The packet should be checked to verify the correct materials are enclosed and the number of copies included is sufficient for the number of competitors. Check every test to make sure that no test is defective. The test packet should then be resealed and not opened again until just prior to the beginning of the contest.

## PERSONNEL

Coaches of competitors may also serve as contest directors, assistants, monitors and calculator verifiers.

- Contest director
- Assistant to the contest director.
- Room Monitor.
- Graders. Almost certainly your best graders will be coaches of the contestants, and we encourage you to use their skill and experience to ensure accurate and efficient grading of the test papers. Designate one grader as the head grader. Make these selections prior to the beginning of the contest.

## TIME REQUIRED

Allot one hour for the contest: up to 30 minutes for roll call, opening remarks, and distributing the tests, and 30 minutes for the testing period. Stay on schedule as some students may need to go to other events.

Arrange for and announce during the opening remarks the time and place of the verification period prior to the announcement of official results.

### **EVENT ROSTER & RESULTS WORKSHEET**

Obtain a copy of the contest roster from the meet director, which will be generated from the UIL Spring Meet Online Entry System. It will list the school, contestant number, contestant name, district or region number and will indicate the competitors and alternates. You also record scores and/or results on this form to give to the meet director, who will then enter the results/scores into the online system before verification is held for the event.

### **ORGANIZING MATERIALS**

Each contestant will be assigned a number indicated on the contest roster. As an example, the number will be listed on the roster as 6A-17 or 2A-4, indicating the conference and a number. The UIL recommends numbering the tests and answer sheets before the contest begins. Write the contestant number in the upper right-hand corner of the test cover sheet and on the answer sheet. Check all tests to ensure that all pages are printed clearly and completely.

(REGION) If there is more than one conference at the meet, it is important to differentiate contestant numbers by conference.

### **SORTING ENVELOPES (DISTRICT)**

Provide and label a large (8 1/2 x 11) envelope for each school entered in the district meet. Write the name of the school and contest on the top of the envelopes. After the verification period, contestants' tests and keys should be placed in the appropriate envelope for return to each school.

# CONDUCTING THE CONTEST

1. Set up the room that will best facilitate the contest where contest officials can sit in view of the contestants.
2. Organize contest materials for easy distribution.
3. Call roll from the roster and provide students with their assigned contestant number. Replace any contestant who is not present with a certified substitute at district and the certified substitute or alternate at regional.
4. Seat the contestants sparsely around the room separating contestants from the same school.
5. Dismiss from the contest room all individuals, except the contestants, contest director and assistants. Instruct graders to report to the grading room.
6. Clearing of calculators is no longer required. Calculators will not be checked or verified respecting any information stored on them prior to the start of the contest.
7. Distribute the test. Caution contestants not to open the test until instructed.
8. Read aloud the following:

## Announcements Prior to Conducting the Contest

- a. Do not open the test until instructed to do so.
  - b. Write the assigned contestant number in the top right-hand corner on the cover page of the test. Check for accuracy if it has already been written on the test.
  - c. You may use any silent, hand-held calculator that does not require auxiliary electric power.
  - d. You may write on the test paper and on the scratch paper provided, but only the answer should be written in the answer space. You may erase or mark out an answer previously written, provided you write the revised answer within the answer space and clearly indicate the answer you wish graded.
  - e. This is a 30-minute contest. No time warnings will be given. Remain in your seat throughout the contest period.
  - f. No talking or distracting noises will be permitted. Students may use timing devices as long as no audible signals are emitted by the devices during the contest. Cell phones, smart watches, tablets, music players, or other similar devices are not to be used as timers and must be turned off and stored during the contest. Be sure that any watch alarms or signals are not set to go off during the contest, and that your cell phone is turned off, not set on vibrate.
  - g. When the end of the contest period is indicated, you must cease calculator operations. After the signal is given you may, however, write down the number displayed on your calculator.
  - h. The test cover sheet illustrates how answers should be written.
  - i. All problems through the last problem completed or attempted will be graded. A problem is considered to have been attempted if any mark or erasure appears in the answer space for that problem.
  - j. Verification period will be held in \_\_\_(name room) at \_\_\_(give time). This is the only time for contestants and coaches to verify grading and unofficial results.
  - k. Are there any questions?
  - l. You may begin the contest.
9. During the contest, remain silent and do not move about. It is very important that the contestants have a quiet setting for the contest.
  10. Give contestants the signal to start. Terminate the contest at the end of exactly 30 minutes, allowing contestants to write one number that is on the calculator (but not transcribe answers written elsewhere on the test.)



11. When the time has elapsed, the contest director should collect all test materials, including scratch paper.
12. Deliver all materials to the grading room.
13. Submit any substitution forms/letters to the meet director to update the original entry in the online entry system.

# GRADING THE CONTEST

## GRADERS

Graders should report to the grading room as soon as the contest begins. The head grader will provide answer keys and surplus tests when the contest has started. Persons not assigned to grade should not enter the grading room.

Graders should review the test and verify the official answer key. If an error is suspected on the answer key of an objectively-scored contest, refer to instructions on Answer Key Errors in the Contest Rules and Procedures section of the contest handbook. Do not “throw out” a question or make any other alterations without a ruling from the UIL State Office and/or the respective state contest director, as this could affect wild card team selection.

Teams advancing to the State Meet shall provide a qualified grader to score papers, unless excused for a valid reason by the contest director.

## GRADING INSTRUCTIONS

Score each paper independently twice, and score papers contending to place among the top six a third time. Record the score on the outside of each paper and have the grader initial it. Coaches should disqualify themselves in scoring their own contestant’s papers, if they recognize handwriting.

Begin grading a paper by marking a line after the last problem attempted. Check the next page to make sure that the contestant did not attempt further problems. Any mark in the answer blank, including erased marks, constitutes an attempt. Any erasure or mark-over (without a second answer) in the answer blank is considered to be incorrect, even if the number can be read and is correct. Students forego their right to consideration of their answer when they erase or mark out an answer.

The UIL Calculator Applications Handbook and the front cover of the test contains detailed information about how answers must be written. Make sure all graders are familiar with these rules.

## SCORING

The first grader should compute the final score according to the formula:  $(5 \times \text{number attempted}) - (7 \times \text{number wrong}) - (2 \times \text{errors in significant digits})$ , then write the score on the front of the test and place his/her initials next to the score. The second grader should compute the score according to the same formula, but also check that the two gradings agree in every detail. Record and initial the second score, and have the two graders work out any disagreement. All papers contending to place should be scored a third time.

The following guidelines are used at the state contest for determining legibility, and are recommended for district and regional contests also:

When doubting the legibility of a numeral or disagreement arises with another grader as to the legibility of a numeral, resolve it in the following manner. In a piece of paper, tear a small hole large enough to show the numeral without anything else. Using this as a mask, show the numeral to three other graders who do not know what the numeral is supposed to be. If two or more agree on what the number looks like, then that is what it is. If no two agree, then the numeral is declared illegible, and the answer is counted wrong. (The standards in the “x10” in scientific notation are lower since this is a standard format.)

### **PLACES AND TIES**

Refer to Calculator Applications Contest Rules and Procedures.

### **IDENTIFYING PAPERS**

After papers have been ranked, indicate on the cover sheet of the test the name and school of the student that corresponds with the contestant number. This will expedite the verification process.

# AFTER THE CONTEST

## **REPORT TO MEET DIRECTOR**

Individual contest directors shall give the contest roster/results form to the district director immediately after the contest papers are scored. The district meet director is responsible for entering results into the online entry system. All scores must be entered into the online entry system prior to verification and announcement of results. Enter all contestants' scores, not just the top six. All scores are needed to determine team results. Provide at least one copy of the unofficial results from the online entry system during verification.

## **VERIFICATION PERIOD**

Announce that no one present may use writing or erasing instruments during the verification period. If the key was changed during the grading process (with the approval of the UIL state office or the state contest director), the contest director shall announce the changes made. The contest director shall allow the contestants and coaches a time period not to exceed 15 minutes to look at all of the following items:

- Contestant's test
- An answer key, in its original form as supplied by the League office
- Display of scores after entry into the UIL Spring Meet Online Entry System

Do not allow anyone to take papers from the room. During this period, the contestants and/or coaches shall verify that they have the correct papers and look for possible errors in the grading, calculation or data entry of scores.

Display each contestant's score (not just the top 6 places) preferably by displaying the printed page from the online scoring system after scores were entered. This will allow data entry of scores to be reviewed by contestants and coaches during the Verification Period.

At State Meet only, the contest director may omit a display of data entry into the UIL Spring Meet Online Entry System if data entry has been carefully reviewed and verified by graders or other assistants during the grading and scoring period.

If errors in grading, scoring or online data entry are found during the verification period, the contest director shall make the corrections.

After resolving all questions, or the end of the 15 minutes, the contest director should announce that the Verification Period has ended. If papers are not being returned on the day of the contest, see Returning Papers below.

## **ANNOUNCING OFFICIAL WINNERS**

The contest director should make any necessary announcements regarding the return of papers if necessary and any instructions regarding the awards ceremony. The contest director will announce official results with the name and the school of each contestant who places individually first through sixth and announce the schools of the first place and alternate teams. These results, once announced as official, shall be final.

**QUALIFICATIONS TO REGIONAL OR STATE**

Contestants can qualify to the next level of competition as individual first, second and third place winners or members of the winning team or wild card team as described in Section 902 (h)(3) of the UIL Constitution and Contest Rules.

**RETURNING PAPERS**

If papers are not being returned, pick up all tests, answer sheets, scoring charts and keys so that none remain with a contestant or coach. Place the materials in the sorting envelopes by school. At the district meet, papers may be returned no sooner than the end of the meet on the last day of the district week. If the region meet is held on Saturday, the test, answer keys, scoring charts and answer sheets may be returned to the contestants the day of the meet.

# CALCULATOR APPLICATIONS QUICK REFERENCE CHART

Note: Grading time varies. For most events, allocate a minimum of two hours.

<b>Contest</b>	<b>Study Material</b>	<b>Calculator Restrictions</b>
<p><b>ROOMS</b> 1 – testing 1 – grading (can use same room as Number Sense)</p> <p>PREPTIME — 30 TESTTIME — 30</p> <p><b>CONTEST MATERIALS</b> UIL Packet: tests &amp; keys.</p> <p>Director Provides: contest roster and results form (generated from online entry system), contest rules, clock, 8 1/2 x 11-inch scratch paper, calculators for graders, pencils and one 8 1/2 x 11-inch envelope per school.</p> <p><b>PERSONNEL</b></p> <ul style="list-style-type: none"><li>• Director</li><li>• One or more assistant(s)/monitor(s)</li><li>• Head grader</li></ul> <p><b># OF ENTRIES</b> (District) six per school (Region) 1<sup>st</sup>/2<sup>nd</sup>/3<sup>rd</sup> individuals per district; 1<sup>st</sup> place team per district; wild card team.</p> <p><b>TIES</b></p> <ul style="list-style-type: none"><li>• Individual — If two or more contestants have identical raw score, the higher place shall be given to the contestant gaining the most points on stated and geometric problems. If still tied, both advance.</li><li>• Team — Break tie with fourth team member score. If tie still exists, all teams involved in tie advance.</li></ul> <p><b>GRADING/JUDGES</b> At least 3, preferably more. Graders may be coaches.</p> <p><b>AWARDS</b> Individual medals: 1<sup>st</sup> through 6<sup>th</sup> Team medals: 1<sup>st</sup> and 2<sup>nd</sup> place teams</p> <p><b>POINTS</b> 1<sup>st</sup> — 15 2<sup>nd</sup> — 12 3<sup>rd</sup> — 10 4<sup>th</sup> — 8 5<sup>th</sup> — 6 6<sup>th</sup> — 4</p> <p>1<sup>st</sup> team — 10 2<sup>nd</sup> team — 5</p> <p><b>ADVANCE:</b> Top 3 individuals and 1<sup>st</sup> place team. One wild card team per regional will also advance.</p>	<p>Visit the UIL Study Materials webpage (<a href="https://www.uil texas.org/academics/resources/study-materials">https://www.uil texas.org/academics/resources/study-materials</a>) to purchase or download study materials. Some materials are available for free download.</p> <ul style="list-style-type: none"><li>• The Calculator Applications Handbook includes a description of the current UIL contest format, rules and procedures. It is available as a free download.</li><li>• The Calculator Applications Contest Manual (Revised, 2023) describes the current contest format and provides a wealth of information about the types of problems included in the contest.</li><li>• Calculator Applications Practice Manual for Stated and Geometric Problems (Revised, 2010). Appendices to the companion Contest Manual include an exhaustive list of unit conversions and a formal formula set for geometry problems intended to provide the assumed knowledge foundation for future stated and geometry problems.</li><li>• Calculator Applications Practice Manual for Numerical Problems (Revised, 2010). The general wisdom in improving speed and accuracy with the number cruncher problems is simply to practice a lot. That is the purpose of this drill manual. The manual provides 26 versions of all seven pages of the contest, 910 problems in all.</li></ul> <p>The Academics homepage of the UIL website contains a variety of additional forms needed for academic programs, including the Professional Acknowledgment Form for all sponsors, coaches and directors of academic events and the Substitute Eligibility Form needed for contestants not listed on the original entry form for UIL meets.</p> <p>The generic forms needed to host invitational meets, such as grading rubrics, answer sheets and contest results form are posted, as are the Academic Meet Director Manual, the conflict pattern and various checklists for Academic Coordinators. Check the different web pages for speech and debate, theatre, and the A+ Program for current information and forms specific to those contests.</p>	<p>All commercially available calculators are permitted provided they are hand-held, can operate silently and do not require auxiliary electric power. Calculators that have gone off the market are permitted so long as they meet the other contest requirements.</p> <p>(a) Calculators may not be user-modified.</p> <p>(b) A maximum of two calculators will be permitted and may be used at any time during the contest.</p> <p>(c) Clearing of calculators is no longer required. Calculators will not be checked or verified respecting any information stored on them prior to the start of the contest.</p>



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Phone: 512.471.5883 • Academic Email: [academics@uil texas.org](mailto:academics@uil texas.org)