



# **2023-2024 Program Guide**





**National Society of Professional Surveyors**  
**21 Byte Court, Suite H, Frederick, MD 21702**  
Phone: 240-439-4615 | Fax: 240-439-4952 | [trig-star.com](http://trig-star.com)

Trig-Star is an annual High School Mathematics Competition sponsored by the National Society of Professional Surveyors (NSPS) and you, the local sponsor. The goal is to recognize and challenge the best students of mathematics from among school districts across the United States utilizing a competition with awards. The purpose of the Trig-Star program is:

- To build an awareness of land surveying as a profession among high school students, career guidance counselors, and high school teachers.
- To acquaint high school students with the use and practical applications of mathematics in the land surveying profession.
- To promote real world applications of mathematics in high school.
- To honor high school students who have demonstrated their superior skill among classmates at the local, state, and national levels.

Your assistance is critical to ensuring the success of the Trig-Star program. Trig-Star can be a tremendous public relations event for the land surveying profession. High school students, their parents, teachers, and the public see first-hand some of the work undertaken by land surveying professionals, and the concern of the profession for rewarding academic achievement and teaching excellence. Thank you for taking the time to become a Trig-Star sponsor.

The Trig-Star Competition can be a good way to introduce high school students to available land surveying college degree programs. Please encourage those students who may have an interest to check the box on the test cover form for more information or scan the new QR code. Checked Cover Sheets can be sent to [info@nsps.us.com](mailto:info@nsps.us.com), and information will be sent to the student.

**Trig-Star Competition results must be submitted to the State Trig-Star Coordinator**  
<https://trig-star.com/coordinators/>

Please review the enclosed material carefully. Each state is responsible for running its own State Trig-Star competition in order to choose a State Trig-Star Champion who will compete in the National Trig-Star. National competitors will be eligible to compete for monetary awards. Teachers of the national winners will be recognized with the Teaching Excellence Award which includes a monetary award.

With your assistance we can maximize the exposure of the land surveying profession to the next generation and create a strong positive image of our profession. The Trig-Star endowment fund was created to ensure the future of our program and provide increased benefits, including scholarships. More information can be found at [trig-star.com](http://trig-star.com). Thank you for your assistance and support of the Trig-Star Program.

*Aaron Leach, PLS*  
NSPS Trig-Star Chairperson

## What's New for 2023/2024

The following is a list of changes made for the 2023/2024 Trig-Star program year:

- QR code provided for additional information on careers in land surveying.
- Online testing will not be available for 2023/2024.
- Local coordinator/sponsors will submit local high school reports directly to the State Coordinator (see page 8 for Local Report form). Refer to the following link to find your State Coordinator: <https://trig-star.com/coordinators/>
- State coordinator is responsible for submitting all paperwork directly to NSPS, including the State winner and reports from all local competitions (see page 9 for State Report form).
- State winners must be submitted to NSPS by May 1, 2024, to participate in the National competition.
- National competition testing will occur after May 1, 2024.

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## PREPARATION FOR THE LOCAL COMPETITION

### Contacting Your Local High School

The first contact with any high school is often the hardest thing to do when trying to get a Trig-Star Program started. Here are some tips:

- Do you know a teacher, guidance counselor or administrator at your local high school that could introduce you to a math teacher?
- Do any of your children, grandchildren, nieces, nephews, etc., attend a nearby high school where you would be willing to visit to present the Trig-Star competition/test?
- Are there any neighbors, friends, church or social groups, teachers or school employees, or fellow employees who may be able to steer you in the right direction to contact the trigonometry teacher or math department head?
- Find out when a teacher is available and make your contact at that time, don't wait for them to call you.

Often, schools can see the benefits of our program, but are unsure how it can be incorporated into the current curriculum. Consider reaching out to programs that may allow more flexibility within their class schedules, such as career technical education (CTE), trade classes, and clubs (SkillsUSA, math, science, engineering).

### Presentation Suggestions

One of the most important parts of the Trig Star Program is your initial presentation. The objective is to discuss careers in Land Surveying with the students. Tell them briefly, what it is, why it's a good career, why we like it and how trigonometry is used in our business as a practical application of math.

There are many Trig-Star presentation formats that can be followed. The variations depend not only on your personal speaking style, but also other factors, such as the size of the group you will be talking to, the amount of time allowed for your presentation and the room configuration that you will be presenting in. For example, small groups allow for more hands-on demonstration of equipment and explanation of Survey Plats or Maps. Questions are more common in small groups and personal connections are easier to make.

On the other hand, larger groups will allow you to reach more students and you may feel that you have made more efficient use of your time. Visual aids and demonstrations make for a better presentation. If you are going to do the competition online with remote students, try to work with the teacher to present your information to the group in an online setting.

#### Examples of Visual Aids and Demonstrations:

- Plats and Maps are always interesting to students, especially if it shows a location they are familiar with.
- Setting up a total station, using a drone, or demonstrating other survey technologies can encourage questions.
- Showing the types of data that is being captured and how it's being used can create discussions.
- Use of 3D/4D imagery from scans can also be a crowd pleaser.

If you can engage the students in doing some sample calculations, they feel more involved. For example, set up the total station in the classroom, a prism in the back of the room and another prism out the door in the hallway, if possible. Then measure the two distances and the interior angle between the lines. Sketch the measurements on the board and ask the students to solve for the unknown distance through the wall. If they seem unsure on how to approach the problem, help them identify the information they have available and how it may fit into the mathematical concepts they might be familiar with, such as the law of cosines. Write out the equation on the board, then have all students perform the calculations on their calculators and come up with an answer.

It is also important to discuss what they should know to prepare for the Trig-Star Competition, such as:

- Use of basic trigonometric functions (sine, cosine, tangent).
- Use of basic trigonometric formulas (law of sine, law of cosine, Pythagorean theorem) and their applications.
- Use of basic circle formulas.
- *Understanding and importance of rounding (for the test).*
  - Distances are rounded to the hundredth for the final answer only. Intermediate solutions for additional calculations should not be rounded, as this may cause rounding errors in the final answer.
  - Angles are rounded to the second and shown as degrees, minutes, and seconds, (DMS) for the final answers.
  - Areas are rounded to the nearest whole unit.
- Use of notes and reference books are NOT allowed. A basic formula sheet will be provided.
- Calculators are permitted for testing. However, programmable calculators are banned from being used. Graphing calculators are considered to be programmable calculators, which are only allowed if they are administered by the school and the teacher has verified that the programs have been cleared prior to testing.

## Resources

[BEaSURVEYOR.com](http://BEaSURVEYOR.com): Website sponsored by National Society of Professional Surveyors (NSPS), providing information and resources relating to the profession of land surveying, including types, education, licensing, state societies and affiliations, and more.

[GetKidsIntoSurvey.com](http://GetKidsIntoSurvey.com): A resource of fun and interactive activities for the land survey community to share the profession with children. (Free posters available)

[NCEES Speaker's Kit](http://NCEES Speaker's Kit): A speaker's kit created by the National Council of Examiners for Engineering and Surveying (NCEES), which includes a Speakers Guide, PowerPoint presentation, script, and videos to help present the value of licensure.

[Trig-Star.com](http://Trig-Star.com): Additional Trig-Star resources and support items

**DON'T WAIT! SCAN THE CODE AND  
GET INFORMATION ABOUT  
BECOMING A SURVEYOR!**

**SCAN ME**



**GET MORE INFORMATION AT  
[BEASURVEYOR.COM](http://BEASURVEYOR.COM)**



## LOCAL COMPETITION RULES

1. Only one Trig-Star competition is allowed per high school per year. The winner will be designated the Trig-Star Champion for that particular school for the year.
2. All competitors in a particular high school must begin the Trig-Star test at the same time.
3. The winner is the student with the highest score. In the event of a tie, the fastest time will determine the winner.
4. The competition incorporates the use of complex trigonometric functions including right triangle formulas, circle formulas, the law of sines, and the law of cosines to solve real problems typically encountered in the surveying and mapping professions.
5. The competition is sanctioned nationally by the National Society of Professional Surveyors and State Surveying Societies, Affiliates, and Associations. The local sponsor is responsible for all competition fees, local promotion, news coverage, and presentation of local awards.
6. There shall be no cost to the competitor for the privilege of competing for the award designation Trig-Star. All Trig-Star competitors are eligible to apply to NSPS for the Trig-Star Scholarship.
7. Calculators are permitted for testing. However, programmable calculators are banned from being used. Graphing calculators are considered to be programmable calculators, which are only allowed if they are administered by the school and the teacher has verified that the programs have been cleared prior to testing.
8. Notes and reference books are NOT allowed. A basic formula sheet is provided or included with the online test package.
9. The maximum time allowed to complete the test is 60 minutes.

Proper reporting of test results must be provided to the State Trig-Star Coordinator for the competition winner to be eligible for the State or National Competition.





## ADMINISTRATION OF THE LOCAL COMPETITION IN PERSON

The following instructions are to be used for the traditional in-person testing, utilizing a “paper” test. Prior to testing, the school sponsor should:

- Verify with NSPS, State Sponsor, or Local Sponsor that Trig-Star test license has been obtained. If the school is working under a state license, you should work with the State Coordinator to ensure that test is available for the current year.
- Choose a test date that is convenient for the school and any additional volunteers/proctors that may be assisting on-site.
- Work with the school to establish a timeline for results, acknowledgment, and awards. It is the responsibility of the local and State sponsors to provide results, acknowledgment, and awards for their level of the contest. For test security, the actual test shall not be returned to the teacher or the students.

### ***ADMINISTRATION OF TEST***

1. Work with school to secure a room for testing and provide an initial count of competitors.
2. Have enough copies of test available for distribution and secure a timer (stopwatch, phone, etc.) for timing the competitors.
3. Obtain the help of additional proctors as needed to assist you with monitoring the competitors as they complete the test. (Larger groups of competitors may require additional proctors.) Teachers usually can fill this role.
4. Calculators are permitted for testing. However, programmable calculators are banned from being used. Graphing calculators are considered to be programmable calculators, which are only allowed if they are administered by the school and the teacher has verified that the programs have been cleared prior to testing.
5. Notes and reference books are NOT allowed. A basic formula sheet will be provided.
6. Competitors should be seated far enough apart to maintain test security.
7. Proctors may distribute tests while initial instructions are being read from the test cover sheet. Competitors may fill in the questions on the test cover sheet at this time but should be instructed NOT to open the test materials until told to do so.
  - a. The maximum time allowed to complete the test is 60 minutes.
  - b. Place answers in the spaces provided – answers shown elsewhere will not count. Be sure to give answers in the format requested.
  - c. All testing materials will be collected when students are finished. For test security, tests will not be returned.
8. Instruct the competitors to open the test materials and begin.

9. Start the timer.
10. As the competitors finish, record their time to the nearest second on the test cover sheet and collect the test and any other test materials (scratch paper, etc.).
11. After 60 minutes, collect all tests that have not been turned in and record a time of 60 minutes.

### ***GRADING AND SCORING OF TEST***

If you are giving the test by yourself, you may find it easier to take all the tests home and score them at a later time. If there are two or more of you giving the test, while one person is keeping the official time (collecting completed tests and marking the times on them); the other person could be scoring the tests.

The winner is the student with the highest score. In the event of a tie, the fastest time will determine the winner.

Students naturally want to know how they did on the test, even if they didn't come out on top. For the security of the test, copies of the tests shall not be given back to the students and teachers.

### ***REPORTING***

It is important to report test results of each participating high school to both the State Trig-Star Coordinator and NSPS to ensure that competitors have the opportunity for future scholarships. The following information should be provided to the State Coordinator, which may be used to determine the overall State Winner:

- Local Competition Report Form
- Copy of first place winner test (paper)
- List of student competitors (name and current grade), excel spreadsheet preferred

### ***RESOURCES***

The following forms and information can be found under Resources at [trig-star.com](http://trig-star.com):

- Participation Certificate (downloadable)
- Trig-Star Medals (\$8 each) – 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> Place available.
- Trig-Star Plaques (\$20 each) – Sponsor is responsible for engraving plaque with the winning student's name, high school, and year of the award. Plaque has room to include Sponsor's name.
- Yearly Scholarship Application
- Photo Release Form
- Sample Press Release
- QR Code



## TRIG-STAR COMPETITION AWARDS & TESTING DATES

### ***LOCAL CONTEST – LEVEL 1***

Local sponsors should work with the State Trig-Star Coordinator to ensure local testing is complete prior to the deadline to announce the State Trig-Star Champion. The following information should be provided to the State Trig-Star Coordinator, which may be used to determine the overall State winner:

- Local Contest Report Form
- Copy of first place winners test (paper), or online testing results
- List of student participants (name and current grade) – excel spreadsheet preferred

### ***STATE WINNER NOTIFICATION***

State Trig-Star Coordinators shall choose and submit the State Trig-Star winners to NSPS by **May 1**. The following information shall be provided to NSPS when submitting the State winner, prior to receiving the test package for the National Competition,

- State Report Form
  - Individual Local Contest Report Form(s)
- List of participating high schools
- Total number of Trig-Star Contest participants within the State
- Value and nature of any awards given at the local level and state level

### ***NATIONAL COMPETITION – LEVEL 2***

State Trig-Star winners are offered the opportunity to take part in the National competition. Test administrators chosen by the State coordinator will receive the National Trig-Star test package after FULL submission of the State reporting package. Test should be administered in accordance with the instructions provided and returned to NSPS.

### ***NATIONAL COMPETITION AWARDS***

The National Trig-Star winners will receive \$2,000 for first place, \$1,000 for second place, and \$500 for third place, in addition to any awards at the state and local level. The math teacher of the Trig-Star winner will receive a Teacher Excellence Award in the amount of \$1,000 for first place, \$500 for second place, and \$250 for third place.



## TRIG-STAR

# National Society of Professional Surveyors LOCAL COMPETITION REPORT

The following items should be submitted to the State Trig-Star Coordinator for determination of the State Trig-Star Champion. The State Trig-Star Coordinator is responsible for selection of the State Trig-Star winner and communicating that information to NSPS for the National Trig-Star Competition.

- ☐ Local Competition Report Form
- ☐ Copy of 1<sup>st</sup> place winner test, unless test was taken on-line
- ☐ List of student competitors (name and current grade), excel spreadsheet preferred
- ☐ Test Cover Sheets of Students requesting additional information should be scanned and sent to [info@nsps.us.com](mailto:info@nsps.us.com)
- ☐ Sponsors should consider announcing the Local Trig-Star winner in the local news. Sample press release and photo release form are available at [trig-star.com](http://trig-star.com).

### Submit Report to State Trig-Star Coordinator

**Date of Competition** \_\_\_\_\_ **Number of Competitors** \_\_\_\_\_

**High School Name** \_\_\_\_\_ **Phone** \_\_\_\_\_

**Address** \_\_\_\_\_

**City** \_\_\_\_\_ **State** \_\_\_\_\_ **Zip Code** \_\_\_\_\_

**Math Teacher's Full Name** \_\_\_\_\_

**Phone** \_\_\_\_\_ **Email** \_\_\_\_\_

**Sponsor's Name or Company** \_\_\_\_\_

**Address** \_\_\_\_\_

**City** \_\_\_\_\_ **State** \_\_\_\_\_ **Zip Code** \_\_\_\_\_

**Phone** \_\_\_\_\_ **Email** \_\_\_\_\_

**1<sup>st</sup> Place Winner Name** \_\_\_\_\_ **Graduation Year** \_\_\_\_\_

**Score** \_\_\_\_\_ **Time** \_\_\_\_\_ **Award Type/Amount** \_\_\_\_\_

**Home Address** \_\_\_\_\_

**City** \_\_\_\_\_ **State** \_\_\_\_\_ **Zip Code** \_\_\_\_\_

**Phone** \_\_\_\_\_ **Email** \_\_\_\_\_

**Parent/Guardian Name(s)** \_\_\_\_\_

**Phone** \_\_\_\_\_ **Email** \_\_\_\_\_

**2<sup>nd</sup> Place Winner Name** \_\_\_\_\_ **Graduation Year** \_\_\_\_\_

**Score** \_\_\_\_\_ **Time** \_\_\_\_\_ **Award Type/Amount** \_\_\_\_\_

**3<sup>rd</sup> Place Winner Name** \_\_\_\_\_ **Graduation Year** \_\_\_\_\_

**Score** \_\_\_\_\_ **Time** \_\_\_\_\_ **Award Type/Amount** \_\_\_\_\_



## STATE COMPETITION REPORT

State Trig-Star winners are chosen by each state based on criteria established by the State Trig-Star Coordinator. The State Trig-Star Coordinator is responsible for selection of the State Trig-Star winner and communicating that information to NSPS for the National Trig-Star Competition.

The NSPS Trig-Star Committee establishes procedures for testing the State Trig-Star winners and choosing a National Trig-Star Champion from the submitted State Trig-Star winners.

State Competition Report Forms must be submitted to NSPS by May 1 to be eligible for the National Trig-Star Competition.

Information related to the National Trig-Star Competition will be emailed to the Test Administrator, as listed on the following State Competition Report Form. The Test Administrator is responsible for administering the National Trig-Star Competition test in accordance with the instructions provided with the National Trig-Star test information. The Test Administrator is also required to administer (in person) the test and verify the results.

**The following items should be submitted to NSPS ([info@nsps.us.com](mailto:info@nsps.us.com)) prior to May 1:**

- ☐ State Competition Report Form
- ☐ State Winner Student Bio Form
- ☐ State Winner Photo (Head shot in digital format please)
- ☐ State Winner Photo Release Form
- ☐ Copies of ALL Local Competition Report packages including:
  - ☐ Local Competition Report
  - ☐ Copy of 1<sup>st</sup> place winner test, unless test was taken on-line
  - ☐ List of student competitors (name and current grade), excel spreadsheet preferred

State Trig-Star Coordinators should consider announcing the State Trig-Star winners in the local news and to their State Land Surveyor Chapters and Affiliates. Sample press release and photo release form are available at [trig-star.com](http://trig-star.com).



**National Society of Professional Surveyors**  
**240-439-4615 | [trig-star.com](http://trig-star.com)**



**TRIG-STAR**

# National Society of Professional Surveyors

## STATE COMPETITION REPORT

**State Coordinator Name** \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

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**Test Administrator Name**

(For National Competition) \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

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**Total Number of High Schools** \_\_\_\_\_ **Total Number of Competitors** \_\_\_\_\_

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**STATE WINNER INFORMATION**

**1<sup>st</sup> Place Winner Name** \_\_\_\_\_ Graduation Year \_\_\_\_\_

Score \_\_\_\_\_ Time \_\_\_\_\_ Award Type/Amount \_\_\_\_\_

Home Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

Parent/Guardian Name(s) \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

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*High School Name* \_\_\_\_\_ *Phone* \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

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*Math Teacher's Full Name* \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

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**2<sup>nd</sup> Place Winner Name** \_\_\_\_\_ Graduation Year \_\_\_\_\_

Score \_\_\_\_\_ Time \_\_\_\_\_ Award Type/Amount \_\_\_\_\_

Home Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

Parent/Guardian Name(s) \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

*High School Name* \_\_\_\_\_ Phone \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

*Math Teacher's Full Name* \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

**3<sup>rd</sup> Place Winner Name** \_\_\_\_\_ Graduation Year \_\_\_\_\_

Score \_\_\_\_\_ Time \_\_\_\_\_ Award Type/Amount \_\_\_\_\_

Home Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

Parent/Guardian Name(s) \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

*High School Name* \_\_\_\_\_ Phone \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

*Math Teacher's Full Name* \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

**CERTIFICATION:**

I hereby certify that the winners listed above are the winners of the State Trig-Star for the current school year.

\_\_\_\_\_  
State Trig-Star Coordinator

Date \_\_\_\_\_



## National Society of Professional Surveyors STATE WINNER STUDENT BIO FORM

Name \_\_\_\_\_ Graduation Year \_\_\_\_\_

High School Name \_\_\_\_\_ Phone \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

1. Where were you born and raised?
2. How many times have you taken part in Trig-Star?
3. Prior to Trig-Star, did you know about careers in Land Surveying?
4. What have you learned from your experience with Trig-Star? What would you say to others about this program?
5. Briefly describe your interests and hobbies:
6. What are your plans after high school? (college/university, technical school, gap year, straight into an industry)
7. Who do you feel has been most influential in your life and why?





## PHOTO RELEASE FORM

**I give permission to NSPS and Trig-Star to use and publish my photograph on their website and social media platforms without compensation**

Name \_\_\_\_\_

Home Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

Parent/Guardian Name(s) \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

(If the participant is a minor, signature of Parent or Guardian is necessary.)



**National Society of Professional Surveyors**  
**240-439-4615 | [trig-star.com](http://trig-star.com)**

# *National Society of Professional Surveyors*

## CERTIFICATE OF PARTICIPATION

*Is hereby presented to*

*In recognition of your participation in the*

## **TRIG-STAR COMPETITION**



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Trigonometry Teacher

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Local Sponsor





# TRIG-STAR NEWS RELEASE

\_\_\_\_\_ has won the designation 2023-2024

TRIG-STAR FOR \_\_\_\_\_ HIGH SCHOOL in

competition held recently. He/She is the son/daughter of

\_\_\_\_\_

from \_\_\_\_\_. The contest was sponsored by

\_\_\_\_\_.

A **TRIG-STAR** is a mathematics student who has demonstrated in competition that they are the most skilled among classmates in the practical application of trigonometry. The competition for the honor is a timed exercise which is the solving of a trigonometry problem that incorporates the use of right triangle formulas, circle formulas, the law of sines, and the law of cosines. The contest helps to promote careers in surveying and mapping to students at the High Schools across the country. The award is sponsored by the National Society of Professional Surveyors and cosponsored locally. State winners also have the opportunity to participate in the National **TRIG-STAR** competition for awards. Visit the Trig-Star website at [www.trig-star.info](http://www.trig-star.info).

For more information please contact:

Trig-Star Coordinator  
21 Byte Court, Suite H  
Frederick, MD 21702  
240-439-4615  
[www.trig-star.info](http://www.trig-star.info)



# TRIG-STAR

## TRIG-STAR SPONSORSHIP AND AWARD ORDER FORM

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

State Trig-Star Sponsorship Qty: \_\_\_\_\_ (@ \$550.00) \$ \_\_\_\_\_  
(Unlimited participating high schools within State)

Local Trip-Star Sponsorship Qty: \_\_\_\_\_ (@ \$ 60.00) \$ \_\_\_\_\_  
(Local Application Form must be submitted for each high school sponsored)

Plaque (\$20.00 each)\* Qty: \_\_\_\_\_ (@ \$ 20.00) \$ \_\_\_\_\_

Participation Medals (\$8.00 each)\*

1<sup>st</sup> Place Qty: \_\_\_\_\_ (@ \$ 8.00) \$ \_\_\_\_\_

2<sup>nd</sup> Place Qty: \_\_\_\_\_ (@ \$ 8.00) \$ \_\_\_\_\_

3<sup>rd</sup> Place Qty: \_\_\_\_\_ (@ \$ 8.00) \$ \_\_\_\_\_

TRIG-STAR ENDOWMENT FUND DONATION (501(c)(3)) \$ \_\_\_\_\_

\* Prices include shipping & handling

**Total:** \$ \_\_\_\_\_

Payment Options:

☐ Invoice/PO \_\_\_\_\_ ☐ Check ☐ Visa ☐ Mastercard ☐ AmEx ☐ Discover

Make checks payable to **NSPS**

Card Number \_\_\_\_\_ Expiration \_\_\_\_\_ Security Code \_\_\_\_\_

Name on Card \_\_\_\_\_ Zip Code \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

I authorize NSPS to charge the credit card listed above for agreed upon purchases.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Please contact NSPS if you would like permission to use the NSPS logo or Trig-Star logo  
for your own local awards: [info@nsps.us.com](mailto:info@nsps.us.com)

**NSPS TRIG-STAR**

**21 Byte Court, Suite H, Frederick, MD 21702**

Phone: 240-439-4615 | Fax: 240-439-4952 | [trig-star.com](http://trig-star.com)

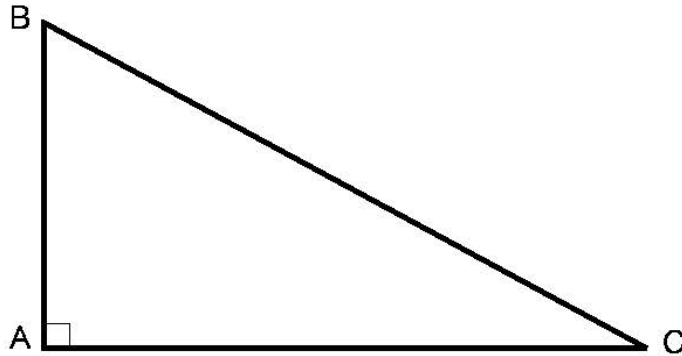


# SAMPLE TEST



**National Society of Professional Surveyors**  
**240-439-4615 | [trig-star.com](http://trig-star.com)**

## TRIG-STAR PROBLEM LOCAL COMPETITION



KNOWN: DISTANCE  $AB = 103.14$       DISTANCE  $BC = 191.75$

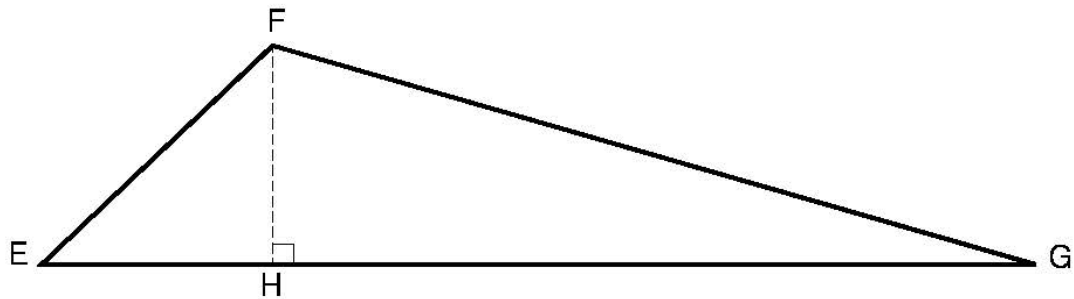
FIND:  $\angle CBA =$  \_\_\_\_\_ (5 POINTS)

DISTANCE  $AC =$  \_\_\_\_\_ (5 POINTS)

### REQUIRED ANSWER FORMAT

DISTANCES: NEAREST HUNDREDTH  
 ANGLES: DEGREES-MINUTES-SECONDS  
 TO THE NEAREST SECOND

## TRIG-STAR PROBLEM LOCAL COMPETITION



KNOWN: DISTANCE  $EF = 111.67$      $\angle EFG = 120^\circ 13' 57''$      $\angle FEG = 42^\circ 00' 18''$

FIND:  $\angle EGF =$  \_\_\_\_\_ (6 POINTS)

DISTANCE  $EH =$  \_\_\_\_\_ (6 POINTS)

DISTANCE  $FH =$  \_\_\_\_\_ (6 POINTS)

DISTANCE  $FG =$  \_\_\_\_\_ (6 POINTS)

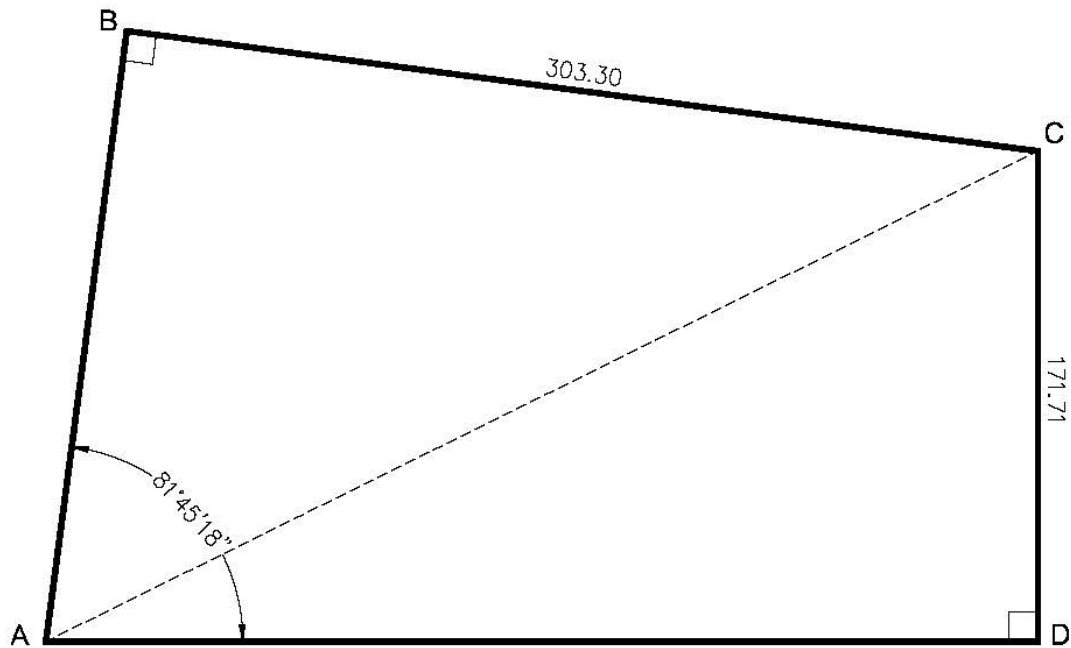
DISTANCE  $GH =$  \_\_\_\_\_ (6 POINTS)

### REQUIRED ANSWER FORMAT

DISTANCES: NEAREST HUNDREDTH  
 ANGLES: DEGREES-MINUTES-SECONDS  
 TO THE NEAREST SECOND

PAGE TOTAL: \_\_\_\_\_ POINTS

## TRIG-STAR PROBLEM LOCAL COMPETITION



KNOWN: DISTANCE BC = 303.30    DISTANCE CD = 171.71  
 $\angle BAD = 81^{\circ}45'18''$

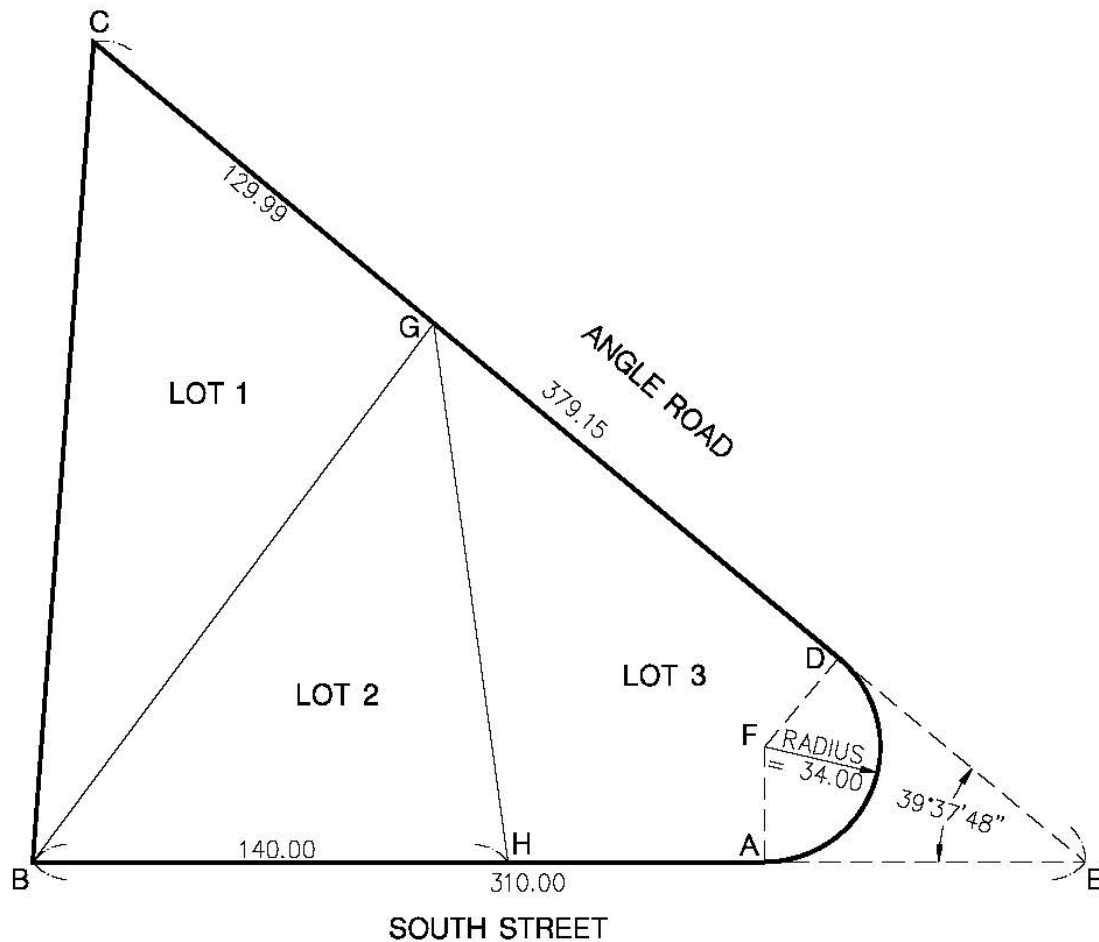
FIND: DISTANCE AB = \_\_\_\_\_ (10 POINTS)  
 DISTANCE AD = \_\_\_\_\_ (10 POINTS)  
 DISTANCE AC = \_\_\_\_\_ (10 POINTS)

REQUIRED ANSWER FORMAT  
 DISTANCES: NEAREST HUNDREDTH

PAGE TOTAL: \_\_\_\_\_ POINTS

## TRIG-STAR PROBLEM LOCAL COMPETITION

A FATHER HAS DIVIDED A TRACT OF LAND AS SHOWN BY FIGURE A, B, C, D, AND ARC DA INTO LOTS FOR HIS THREE CHILDREN. THE TIME HAS COME FOR THE CHILDREN TO DETERMINE WHO GETS WHICH LOT. THEY DECIDE TO DRAW FROM A DECK OF CARDS FOR FIRST AND SECOND CHOICE. THE CHILDREN WOULD LIKE MORE INFORMATION BEFORE THEY MAKE THEIR CHOICES.



FIND:

DISTANCE BC = \_\_\_\_\_ (5 POINTS)

DISTANCE BG = \_\_\_\_\_ (5 POINTS)

DISTANCE GH = \_\_\_\_\_ (5 POINTS)

ARC DISTANCE AD = \_\_\_\_\_ (5 POINTS)

AREA LOT 1 = B,C,G,B = \_\_\_\_\_ (5 POINTS)

AREA LOT 3 = A,H,G,D, ARC DA = \_\_\_\_\_ (5 POINTS)

**REQUIRED ANSWER FORMAT**

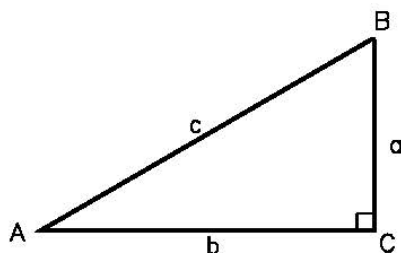
DISTANCES: NEAREST HUNDRETH  
AREA: NEAREST WHOLE UNIT

PAGE TOTAL: \_\_\_\_\_ POINTS



# TRIG-STAR MISCELLANEOUS DATA

## RIGHT TRIANGLE FORMULAS

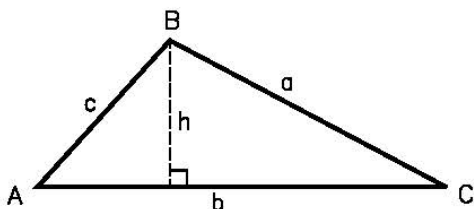


PYTHAGOREAN THEOREM:  $a^2 + b^2 = c^2$

AREA:  $\frac{1}{2}ab$

TRIGOMETRIC FUNCTIONS:  $\sin A = \frac{a}{c}$      $\cos A = \frac{b}{c}$   
 $\tan A = \frac{a}{b}$

## OBLIQUE TRIANGLE FORMULAS



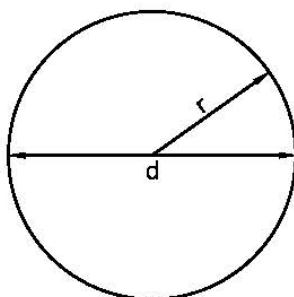
LAW OF SINES:  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

LAW OF COSINES:  $a^2 = b^2 + c^2 - 2bc \cos A$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

AREA:  $\frac{1}{2}bh$

## CIRCLE FORMULAS



DIAMETER =  $d$       RADIUS =  $r$

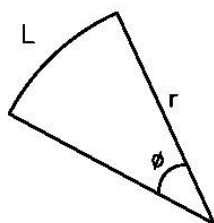
CIRCUMFERENCE:  $2\pi r$  or  $\pi d$

AREA:  $\pi r^2$

ONE DEGREE (1°) OF ARC = 60 MINUTES (60') OF ARC

ONE MINUTE (1') OF ARC = 60 SECONDS (60'') OF ARC

THEREFORE ONE DEGREE OF ARC (1°) = 3600 SECONDS OF ARC.



ARC LENGTH =  $2\pi r\phi/360$

AREA:  $\pi r^2(\phi/360)$

## TRIG-STAR ANSWER KEY LOCAL COMPETITION

### PAGE 1

$$\angle CBA = 57^{\circ}27'36''$$

$$\text{DISTANCE AC} = 161.65$$

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### PAGE 1

$$\angle EGF = 17^{\circ}45'45''$$

$$\text{DISTANCE EH} = 82.98$$

$$\text{DISTANCE FH} = 74.73$$

$$\text{DISTANCE FG} = 244.96$$

$$\text{DISTANCE GH} = 233.28$$

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### PAGE 2

$$\text{DISTANCE AB} = 217.45$$

$$\text{DISTANCE AD} = 331.35$$

$$\text{DISTANCE AC} = 373.20$$

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### PAGE 3

$$\text{DISTANCE BC} = 242.50$$

$$\text{DISTANCE BG} = 198.00$$

$$\text{DISTANCE GH} = 160.42$$

$$\text{ARC DISTANCE AD} = 83.30$$

$$\text{AREA OF LOT 1} = B,C,G,B = 12,851$$

$$\text{AREA OF LOT 3} = A,H,G,D,\text{ARC DA} = 11,716$$