

RELATED TECHNICAL MATH (VIRTUAL)



PURPOSE

To evaluate the contestant's understanding and ability to solve mathematical problems commonly found in the skilled trades, professional and technical occupations.

First, download and review the General Regulations at: <http://updates.skillsusa.org>.

ELIGIBILITY

Open to active SkillsUSA members.

CLOTHING REQUIREMENTS

Class E: Contest specific — Business Casual

- Official SkillsUSA white polo shirt.
- Black dress slacks (accompanied by black dress socks or black or skin-tone seamless hose) or black dress skirt (knee-length, accompanied by black or skin-tone seamless hose).
- Black leather closed-toe dress shoes.

Contest Clothing Notes (Apply ONLY to Virtual Competitions):

- Official SkillsUSA Competition Clothing recommended but NOT required.
- Contestant clothing options include the following:
 - Official Competition Clothing.
 - Trade Appropriate Clothing.
 - Professional Dress.
 - Business Casual.
- Clothing must meet industry safety standards.
- No identification of the contestant, school or state is allowed on clothing.
- No offensive, vulgar or inappropriate images or text are allowed on contestants clothing.
- No shorts or sleeveless shirts are allowed.
- Skirts must be at least knee-length.
- Proper Personal Protective Equipment (PPE) must be worn by contestant to meet all state, local and school requirements due to COVID-19.

- Scoring deductions may only be given and/or disqualification of contestant if clothing safety standards are not met.

These regulations refer to clothing items that are pictured and described at:

www.skillsusastore.org. If you have questions about clothing or other logo items, call 1-888-501-2183.

Note: Contestants must wear their official contest clothing to the contest orientation meeting.

OBSERVER RULE

Observers will be allowed to view the test. No talking or gesturing with contestants or any disruptive noise will be permitted.

EQUIPMENT AND MATERIALS

1. Supplied by technical committee:
 - a. Test problems and instructions
 - b. Formula sheets and conversion tables/charts
- Note For Virtual Competition:** The written knowledge test may be administered online or in hard-copy format, with contestants being monitored through Zoom or similar online video sources. Format of written test to be determined by the technical committee. Instructions and additional information will be provided on the SkillsUSA website at: <http://updates.skillsusa.org>.
2. Supplied by the contestant:
 - a. Tables and chairs
 - b. Scratch paper and pencils
 - c. Computer with high-speed internet capability and camera to use applications such as Zoom, Teams, etc. The minimum recommended internet bandwidth speeds for joining Zoom meetings, accessing on-demand curriculum and other online operations is 2.0 Mbps up and down. You can test your current internet speeds by following this link: <https://www.speedtest.net/>. Allow the page to load and click on GO.
 - d. A secondary camera(s) may be required to provide judges with the ability to

view contestants from different angles. Additional camera requirements will be located on the SkillsUSA website at <http://updates.skillsusa.org>.

- e. A contest Proctor will be required to be on site to assist judges. A local industry expert is preferred to serve as the Proctor and shall not be an individual that has been involved with the training of the contestant(s). The Proctor will serve as the onsite “hands and eyes” for the judges. Proctor will follow instructions from the judges for safety and operations related to the competition. Proctor may be asked by judges to perform several tasks such as operating a portable camera to show specific components or steps, measure parts, or any task that will provide judges with information needed to assist in accurate scoring of the contestant’s work or presentation. However, the Proctor shall not serve as a judge nor have any influence on contestant scores.
- f. The contestant’s instructor or advisor shall be on site to observe all competition activities to ensure a safe and healthy competition experience for all participants. That instructor or advisor will not be allowed to interact or interfere with the competitor unless a safety issue arises that requires interaction. Any other support or interaction between the contestant and the instructor/advisor will result in disqualification
- g. All competitors must create a one-page résumé and submit an electronic copy to the technical committee chair at least seven (7) days in advance of the competition. Failure to do so will result in a 10-point penalty. Instructions for submission of the electronic résumé copy will be provided on the SkillsUSA website at <http://updates.skillsusa.org>.
- h. Hand-held calculator

Note: Your contest may also require a hard copy of your résumé as part of the actual contest. Check the Contest Guidelines and/or the updates page on the SkillsUSA website at <http://updates.skillsusa.org>.

Note: No reference materials may be used other than those provided by the technical committee.

SCOPE OF THE CONTEST

Knowledge Performance

A written knowledge test will be required. A sound knowledge of geometry, algebra, trigonometry and basic statistics will prepare the students to exhibit their problem-solving skills for this part of the contest.

Skill Performance

There is no skill performance component of this contest.

Contest Guidelines

1. The written knowledge test comprises 50 problems applicable to any career and technical field. It covers applications of the fundamental operations of whole numbers, fractions and decimals, including applications of percentages, ratio and proportion, averages, areas and volumes.
2. The written knowledge test will provide the student the opportunity to demonstrate his or her problem-solving skills, not just mathematical ability.
3. Students have two hours to complete the problems and check their answers.
4. Hand-held calculators may be used. Competitors need nothing more than a simple scientific calculator that can be purchased for about \$10–\$15. A graphing calculator is not necessary. The test is based on real-world mathematical applications and reasoning — not theoretical mathematics.
5. No bonus will be given for early completion of the written knowledge test.

Standards and Competencies RTM 1.0 — SkillsUSA Framework



The SkillsUSA Framework is used to pinpoint the Essential Elements found in Personal Skills, Workplace Skills, and Technical Skills Grounded in Academics. Students will be expected to display or explain how they used some of these Essential Elements. Please reference the graphic above, as you may be scored on specific elements applied to your project. For more, visit: www.skillsusa.org/about/skillsusa-framework/.

The remaining standards and competencies for this contest will be completed by the national technical committee in the next edition of the Technical Standards. In the meantime, visit: <http://updates.skillsusa.org/> for updates.

Committee Identified Academic Skills

The technical committee has identified that the following academic skills are embedded in this contest.

Math Skills

- Use fractions to solve practical problems.
- Use proportions and ratios to solve practical problems.
- Simplify numerical expressions.
- Use scientific notation.
- Solve practical problems involving percentages.
- Solve single variable algebraic expressions.
- Solve multiple variable algebraic expressions.
- Measure angles.

- Apply Pythagorean Theorem.
- Graph linear equations.
- Solve problems using proportions, formulas and functions.
- Find slope of a line.
- Use laws of exponents to perform operations.
- Solve quadratic equations.
- Solve practical problems involving complementary, supplementary and congruent angles.
- Solve problems involving symmetry and transformation.
- Use measures of interior and exterior angles of polygons to solve problems
- Find arc length and the area of a sector.

Science Skills

None Identified

Language Arts Skills

None Identified

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

- Math Standards.
- Numbers and operations.
- Algebra.
- Geometry.
- Measurement.
- Data analysis and probability.
- Problem solving.
- Communication.
- Connections.
- Representation.

Source: NCTM Principles and Standards for School Mathematics. For more information, visit: <http://www.nctm.org>.

Science Standards

- Understands the nature of scientific inquiry.

Source: McREL compendium of national science standards. To view and search the compendium, visit: <http://www2.mcrel.org/compendium/browse.asp>.

Language Arts Standards

None Identified

Source: IRA/NCTE Standards for the English Language Arts.
To view the standards, visit: www.ncte.org/standards.