2024-26 EDITION

SkillsUSA CHAMPIONSHIPS

MEDICAL MATH

SkillsUSA Championships Technical Standards

PURPOSE

To evaluate the students' ability to understand and solve mathematical problems commonly used in the various health care settings.

First, download and review the General Regulations at updates.skillsusa.org.

ELIGIBILITY

Open to active SkillsUSA members enrolled in a healthcare science technology program. Each state may send one high school and one college/postsecondary entry.

CLOTHING REQUIREMENTS

Class B: Healthcare Attire

- Official SkillsUSA blue scrubs
- White socks or white seamless/nonpattern hose visible above the top of the shoe
- Health-professionals white or black work shoe

Note: Scrubs should fit correctly and must be hemmed and wrinkle-free. A plain white crewneck T-shirt may be worn underneath the scrub top, and it should not be visible from the bottom of the sleeve or the bottom hem area of the scrub top. Hair must be pinned up and off the collar.

Note: Shoes must be all-white or black (no canvas/mesh) and completely enclosed (no open-toe or open-heel). Athletic-style shoes that meet the criteria are acceptable.

These regulations refer to SkillsUSA Championships Clothing Classifications that are pictured and described at skillsusastore.org. If you have questions about competition uniforms, call the SkillsUSA Store at 888-501-2183.

Note: Competitors must wear their official competition clothing to the competition orientation.

EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
   a. Test problems and instructions
   b. Scratch paper
2. Supplied by the competitor:
   a. Basic hand-held calculator (no graphing or scientific calculators [with fraction keys] will be permitted.) (Cellular phones are not permitted in the test area, due to calculator and internet functions.)
   b. No. 2 pencil
   c. All competitors must create and submit online a one-page single sided resume. See "Online Submission Requirements" below for guidelines.

Note: All national competitors must also check for competition-specific updates and/or competitor preparation instructions on the SkillsUSA website at updates.skillsusa.org.

PROHIBITED DEVICES

Cellphones, electronic watches and/or other electronic devices not approved by a competition's national technical committee are ***NOT*** allowed in the competition area. Please follow the guidelines in each technical standard for approved exceptions. Technical committee members may also approve exceptions onsite during the SkillsUSA Championships if deemed appropriate.

Penalties for Prohibited Devices

If a competitor's electronic device makes noise or if the competitor is seen using it at any time during the competition, an official report will be documented for review by the Director of the SkillsUSA Championships. If confirmed that the competitor used the device in a manner which compromised the integrity of the competition, the competitor's scores may be removed.

ONLINE SUBMISSION REQUIREMENTS

All SkillsUSA national competitors must submit their one-page single sided resume online. The deadline and link for online submissions will be published on updates.skillsusa.org.
Failure to submit any of the required document(s) listed below by the established deadline will result in a 10-point penalty.

1. One-page single sided resume

Your submission must be saved as PDF file type using the file name format of "Your Last Name_Your First Name_Resume." For example, "Amanda Smith" would save the individual PDF submissions file as:

- Smith_Amanda_Resume

OBSERVER RULE

The competition is closed to observers.

SCOPE OF COMPETITION

KNOWLEDGE PERFORMANCE

The competition includes a test assessing knowledge of medical math problem solving. Competitors are also required to take the SkillsUSA Professional Development Test.

SKILLS PERFORMANCE

Competitors will demonstrate their ability to solve math problems that deal based on realistic scenarios encountered in the medical field.

COMPETITION GUIDELINES

1. The test will be comprised of problems that will allow competitors the opportunity to use their problem-solving skills as well as their mathematical ability that pertain to the following areas:
    a. Measurements including vital signs, temperature conversions, and height and weight
    b. Metric and household measurements
    c. Conversions
    d. Ratio and proportion
    e. Percentage
    f. Intake and output
    g. Roman numerals
    h. Dosage calculations
2. Hand-held calculators may be used.
    a. Competitors need nothing more than a simple scientific calculator. The test is based on real-world mathematical applications and reasoning not theoretical mathematics.
3. No watches/smartwatches/cellphones or other timing devices are permitted in the competition area.
4. No reference materials may be brought into the competition area.
5. Competitors will have a maximum of two hours to complete the problems and check answers.
    a. Once the testing allotted session time has commenced, no additional time will be provided if a competitor reports late to the competition area.
    b. No bonus will be given for early completion of the competition knowledge test.
6. Competitors will not be allowed to go in or out of the competition area during testing.
7. Suggested references: “Standardized Medical Abbreviations”.
8. Test question content is not limited to either the suggested references and/or the lists provided in this document.

***Note*:** The sample medical abbreviation and charts provided as a reference in this document are not allowed in the competition area.

Medical Abbreviations

The following list is to be used as a reference ***prior to the competition***, but it is ***not*** allowed in the competition area. This list of terms and abbreviations is a sample of abbreviations taken from *Diversified Health Occupations* (Simmers, Louise).

Term	Abbreviation
millimeter	mm
centimeter	cm
meter	m
foot/feet	ft
inch	in
gram	G
milligram	mg
microgram	mcg
kilogram	kg
pound	lb
ounce	oz
degrees Fahrenheit	°F
degrees Celsius (Centigrade)	°C
cubic centimeter	cc
milliliter	ml or mL
liter	L

Term	Abbreviation
unit	U
pint	pt
quart	qt
gallon	gal
tablespoon	tbsp
teaspoon	tsp
drop or drops	gtt or gtts
minim	minim
dram	dr
milliequivalent	mEq
grain	gr
intravenous	IV
tablet	tab
capsule	cap
suspension	susp
intake and output	I & O

Conversion Charts

The following list is to be used as a reference ***prior to the competition***, but it is ***not*** allowed in the competition area.

Length	• 1 meter = 100 centimeters = 1,000 millimeters • 10 millimeters = 1 centimeter
Weight	• 1 gram = 1,000 milligrams • 1 milligram = 1,000 micrograms • 1 kilogram = 1,000 grams • 1 grain = 60 milligrams
Volume for Solids	• 1,000 cubic millimeters = 1 cubic centimeter • 1,000 cubic centimeters = 1 cubic decimeter • 1,000 cubic decimeters = 1 cubic meter
Volume for Fluids	• 1 liter = 1,000 milliliters • 1 milliliter = 1 cubic centimeter • 10 centiliters = 1 deciliter • 10 deciliters = 1 liter

Weight Conversion	• 1 kilogram = 2.2 pounds • 1 pound = 16 ounces • 1 ounce = 0.028 kilograms
Temperature Conversion	• °C = (°F-32) 5/9 or 0.5556 • °F = (°C) 9/5 or 1.8 + 32

Metric/Household Equivalents

Note: 1 cc = 1 mL

1 cc or 1 mL	15 gtts (drops)
0.914 meters	3 feet (1 yard)
0.3048 meters	12 inches (1 foot)
2.54 centimeters	1 inch
5 mL or cc	1 tsp (teaspoon)
15 mL or cc	1 tbsp (tablespoon)
30 mL or cc	1 oz. (ounce)
240 mL or cc	1 cup (8 oz.)
480 mL or cc	1 pt (pint) (16 ounces)
960 mL or cc	1 qt (quart) (32 ounces)
1 meter	39.37 inches (3.281 feet)

STANDARDS AND COMPETENCIES

MM 1.0 — Demonstrate medical mathematical skills using planning and decision-making

1.1 Recognize basic medical abbreviations
1.2 Identify and give the meaning of selected prefixes that pertain to position or placement, numbers and amounts, and those that are descriptive and used in general
1.3 Identify and give the meaning of selected prefixes that pertain to position or placement, numbers and amounts, and those that are descriptive and used in general
1.4 Establish work priorities
1.5 Using information and processes to problem-solve and make choices
1.6 Analyze key facts, data and situations
1.7 Weigh multiple outcomes
1.8 Apply new learning
1.9 Employ technology to solve problems
1.10 Evaluate the finished results and make appropriate modifications

MM 2.0 — Project a professional self-image through attire and grooming

2.1. Demonstrate a professional appearance in dress, good grooming, and personal presentation
2.2. Display clothing that meets national standards requirement for competition
2.3. Demonstrate good grooming in personal hygiene
2.4. Wear clothing that fits well
2.5. Present a wrinkle-free appearance

MM 3.0 — 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. For more, visit: www.skillsusa.org/who-we-are/skillsusa-framework/.

COMMITTEE IDENTIFIED ACADEMIC SKILLS

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

Math Skills

- Demonstrate measuring skills
- Make comparisons, predictions and inferences using graphs and charts
- Simplify numerical expressions
- Solve single and multiple variable algebraic expressions
- Solve practical problems involving percentages
- Solve problems using proportions, formulas and functions
- Use fractions to solve practical problems
- Use laws of exponents to perform operations
- Use proportions and ratios to solve practical problems

Science Skills

- Use knowledge of patterns of cellular organization (cells, tissues, organs, systems)
- Use knowledge of temperature scales, heat and heat transfer

CONNECTIONS TO NATIONAL STANDARDS

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

Math Standards

- Numbers and operations
- Algebra
- Communication
- Connections
- Data analysis and probability
- Measurement
- Numbers and operations
- Operational analysis
- Problem-solving
- Reasoning and proof
- Representation

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