Appendix I. Judgmental Standard Setting Borderline Performance Descriptors

Presented for both mathematics and reading content areas across all occupational areas (CSS, HVAC, LPN, PT Introductory, PT Concluding, and AMT)

Reading Borderline Performance Description
Automotive Master Technician
Pilot Study
(Version 4.0)

Students minimally prepared for entry into a postsecondary credit-bearing and/or certificate-granting automotive training program should be able to understand the meaning of words used in both general and technical/procedural contexts and be able to learn the specialized vocabulary found in technical/procedural texts. These students should be able to identify important information and relevant details correctly in texts, integrate information, and draw conclusions. They should be able to read charts, diagrams, figures, and illustrations and understand their purposes and relationships to appropriate texts. They should be able to locate information needed for specific purposes and be able to recall and summarize this information and follow the sequence of events in a process. They should understand the difference between a fact and an opinion and be able to evaluate sources of information for credibility/trustworthiness. They should make connections, integrate information presented within and across texts, and apply what they have read.

Reading Borderline Performance Description
Practical/Vocational Nurse Student
Operational Workshop
(Version 2.0)

Students minimally prepared for entry into a postsecondary credit-bearing and/or certificate-granting practical/vocational nursing program should be able to understand the meaning of vocabulary used in both general and informational contexts. These students should be able to identify, interpret, and analyze important information and relevant details correctly; summarize information; and draw conclusions. They should be able to read charts, diagrams, figures, and illustrations and understand their purposes and relationships. They should be able to locate information needed for specific purposes, follow the sequence of events in a process and be able to recall and apply this information to new situations. They should understand the difference between a fact and an opinion and be able to evaluate information sources. They should be able to integrate information presented within and across texts and apply what they have read.

Reading Borderline Performance Description
Pharmacy Technician
Operational Workshop
(Version 2.0)

Students minimally prepared for entry into a postsecondary credit-bearing and/or certificate-granting pharmacy technician program should be able to understand the meaning of general vocabulary and recognize its differential use in technical and procedural contexts. These students should be able to identify important information and relevant details, summarize information, draw conclusions, and communicate those conclusions. They should be able to read charts, diagrams, figures, and illustrations and understand their purposes. They should be able to locate and evaluate sources of information needed for specific purposes, follow instructions and/or the sequence of events in a process, and be able to recall and apply this information to a variety of situations. They should understand the difference between a fact and an opinion. They should be able to integrate information within and across texts, and apply what they have read to other contexts and scenarios.

Reading Borderline Performance Description
HVAC
Operational Workshop
(Version 2.0)

Students minimally prepared for entry into an HVAC job training program should be able to determine the meaning of vocabulary used in general and technical contexts. These students should be able to identify important information and relevant details, summarize information, and draw conclusions. They should be able to recognize basic graphical figures and illustrations. They should be able to locate information needed for specific purposes, follow the sequence of events in a process, and be able to recall and apply this information to new situations. They should understand the difference between facts and opinions and be able to discriminate among sources of information. They should be able to integrate and analyze information presented within and across texts, and apply what they have read to other contexts and scenarios.

Reading Borderline Performance Description
Computer Support Specialist
Operational Workshop
(Version 2.5)

Students minimally prepared for entry into a computer support specialist job training program should be able to understand the meaning of vocabulary used in both general and technical contexts. These students should be able to identify and interpret important information and relevant details, summarize information, and draw conclusions. They should be able to locate information needed for specific purposes and follow the sequence of events in a process. They should be able to understand the difference between facts and opinions and be able to evaluate sources of information used in the text and provide evidence from the text to support their evaluations. They should be able to integrate relevant information presented within and across texts and apply what they have read to other contexts and scenarios.

Mathematics Borderline Performance Description
Automotive Master Technician
Pilot Study
(Version 4.0)

In the area of **number properties and operations**, students minimally prepared for placement into entry-level automotive training programs should know how to use numerical expressions to represent situations and how to compare such expressions. They should be able to use estimation to solve problems and verify solutions, and they should understand and be able to perform arithmetic operations on real numbers including very large and very small numbers and scientific notation. These students should also be able to use proportions, percentages, factors, multiples, prime factorization, divisibility, or remainders to solve problems. Students performing at the minimally prepared level should also understand and be able to use properties of numbers and the number system and be able to give a mathematical argument to establish the validity of a simple numerical property or relationship.

To demonstrate at least minimal preparedness in **measurement**, students should know how to solve problems involving geometric measures, including both direct and indirect measures, with an emphasis on angle measure, length, area, perimeter, and volume. These students should be able to measure with precision and accuracy. They should know how to solve problems involving rates and units of measurement (such as flow, torque, temperature, time, pressure, density, and speed), including conversion within and between measurement systems.

To demonstrate at least minimal preparedness in **geometry,** students should be able to use two-dimensional representations of three-dimensional objects to visualize and solve problems. Students should also be able to recognize similar geometric figures and symmetries of figures. They should be able to analyze properties and relationships of parallel or intersecting lines, including perpendicular lines.

To perform at the minimally prepared level in **data analysis, statistics, and probability,** students should be able to interpret data in a spreadsheet in order to solve problems and be able to read, interpret, construct, and critique graphs or tables of data such as line graphs, bar charts, scatterplots, and Cartesian graphs. Additionally, these students should be able to interpret and analyze uses of data in practical applications. Students should be able to use or interpret the mean and range of a set of data.

In **algebra**, minimally prepared students should be able to write simple algebraic expressions, equations, or inequalities to represent a situation. They should also be able to evaluate expressions and solve equations or inequalities. In addition, these students should be able to solve problems involving special formulas such as Ohm's Law. Students should recognize the relationship between two variables, be able to identify functions as linear or nonlinear and have an understanding of slope. In addition, they should understand basic properties of sine functions such as frequency, period, and amplitude.

Mathematics Borderline Performance Description
Licensed Practical Nurse
Operational Workshop
(Version 4.0)

In the area of **number properties and operations**, students minimally prepared for placement into entry-level licensed practical nursing programs should know how to use numerical expressions to represent situations and how to compare such expressions. They should be able to use estimation to solve problems and verify results. They should understand and be able to perform arithmetic operations on real numbers including very large and very small numbers. They should have a basic understanding of numbers written in scientific notation. These students should also be able to use ratios, proportions, factors, multiples, divisibility, or remainders to solve problems. They should be able to convert among fractions, decimals and percents. Students performing at the minimally prepared level should also understand and be able to use properties of numbers and the number system.

To demonstrate at least minimal preparedness in **measurement and geometry**, students should be able to measure with precision and accuracy. They should be familiar with common angle measures and measures of time. These students should understand the relationships between proportions and measures such as length, weight, area, and volume. They should be familiar with common customary measurements and the metric system, and have familiarity with basic geometric terms and relationships (e.g., horizontal, vertical, parallel, perpendicular). They should know how to solve problems involving rates. Students should be familiar with units of measurement and be able to label results with appropriate units. Additionally, they should be able to convert measures within and between measurement systems.

To perform at the minimally prepared level in **data analysis, statistics, and probability,** students should be able to read, interpret, and construct simple graphs or tables of data, such as line graphs, bar charts, and pie charts. Additionally, these students should be able to interpret and analyze uses of data in practical applications. Students should be able to use or interpret the mean and range of a set of data. They should also be able to distinguish relevant from irrelevant information, identify missing information, and either find what is needed or make appropriate approximations. Students should be able to find the probability of a simple event. Additionally they should be able to recognize a random sample from a population.

In **algebra**, minimally prepared students should recognize the relationship between two variables (e.g., as one value increases another may decrease). Students should be able to read and write simple algebraic expressions, equations, or inequalities to represent a situation. They should also be able to evaluate expressions and solve simple equations or inequalities. In addition, these students should be able to use and evaluate common formulas.

Both within and across the content areas, students should be able to solve multi-step word problems.

Mathematics Borderline Performance Description
Pharmacy Technician
Operational Workshop
(Version 4.0)

In the area of **number properties and operations**, students who are minimally prepared for placement into entry-level pharmacy technician training programs should be able to interpret and compare various expressions of numbers. These students should understand and know how to perform arithmetic operations with real numbers, using the correct order of operations. They should also understand and be able to use place value and other properties of numbers and the number system, and apply that knowledge to problem situations. When solving problems, these students should be able to use fractions, decimals, ratios, proportions, percentages, exponents, factors, multiples, divisibility, and remainders. They should be able to use estimation to determine the reasonableness of results in a variety of situations.

In **measurement**, to demonstrate at least minimal preparedness, students should recognize that measurements depend on the choice of a unit and should be able to apply such units in expressions, equations, and problem solutions. They can solve problems involving conversions within or between measurement systems, and problems involving rates of change and units of measurement, including metric units. These students understand that numerical values associated with measurements of physical quantities must be assigned units of measurement. They can determine appropriate accuracy of measurement in various situations.

In **data analysis and statistics,** to demonstrate at least minimal preparedness, students should know how to interpret graphs and tables. They should know common measures of center, such as mean, and measures of spread, such as range. They should understand the concept of bias. Further, they can distinguish relevant from irrelevant information, identify missing information, and find the information that is needed.

In **algebra**, students with minimal preparation should know and be able to write algebraic expressions, equations, or inequalities to represent a situation. They can perform basic operations, using appropriate tools, on algebraic expressions. They should be able to evaluate algebraic expressions. Finally, they can use algebraic properties to develop a valid mathematical argument.

Both within and across the content areas, students should be able to solve multi-step word problems.

Mathematics Borderline Performance Description
Computer Support Specialist
Operational Workshop
(Version 4.0)

In the area of **number properties and operations**, students who are minimally prepared for placement into an entry-level computer support specialist program should be able to interpret, compare, and order various representations of numbers, including numbers expressed in scientific notation. These students should know how to identify situations where estimation is appropriate, verify solutions, and determine the reasonableness of results. They should understand and know how to perform arithmetic operations using the correct order of operations and apply that knowledge to solve problems involving fractions, decimals, exponents, absolute value, ratios, proportions, and percentages. Students who are minimally prepared should be able to use concepts from number theory such as factors, multiples, divisibility, and remainders. They should understand and be able to use place value and other properties of numbers and the number system, and apply that knowledge to problem situations.

In **measurement**, to demonstrate at least minimal preparedness, students should recognize that measurement depends on the choice of units. They can solve problems involving conversions within or between measurement systems, and problems involving rates of change. They understand that numerical values associated with measurements of physical quantities are approximations subject to variation and must be assigned measurement units. They can estimate or compare the perimeters or areas of two-dimensional geometric figures as well as the surface areas or volumes of three-dimensional geometric figures.

In **data analysis, statistics, and probability,** to demonstrate at least minimal preparedness, students should know how to interpret graphical or tabular representations of data. For a given set of data, they can complete a graph, table, or spreadsheet and recognize patterns or solve a problem using the data. Given a representation of a set of data, they can determine whether the information is represented effectively and appropriately. They should know common measures of typical value, such as median; measures of position, such as percentile; and measures of spread, such as range. Further, they can distinguish relevant from irrelevant information and identify missing information. They can determine and estimate the probability of simple events.

In **algebra,** to demonstrate at least minimal preparedness, students should know how to solve problems involving numerical patterns, including making inferences or predictions. They should be able to write, manipulate, and evaluate algebraic expressions and functions. In addition, they can create, analyze, interpret, and translate between simple verbal, tabular, graphic, or symbolic representations of equations and inequalities. These students should know how to solve linear equations and inequalities, including solving an equation or formula with several variables for one variable in terms of the others.

Both within and across the content areas, students should be able to solve multi-step word problems.

Mathematics Borderline Performance Description
HVAC
Operational Workshop
(Version 4.0)

To demonstrate at least minimal preparedness for placement into entry-level HVAC programs the area of **number properties and operations**, students should know how to use numerical expressions to represent situations and how to compare such expressions, including expressions with absolute value. They should be able to use estimation strategies such as rounding to solve problems and use number sense to verify solutions. They should understand and be able to perform arithmetic operations on rational and common irrational numbers, including very large and very small numbers with scientific notation. These students should also be able to use proportions, percentages, factors, multiples, reciprocals, divisibility, and/or remainders to solve problems. Students performing at the minimally prepared level should also understand and be able to use properties of numbers and the number system.

To demonstrate at least minimal preparedness in **measurement**, students should know how to solve problems involving geometric measures, including both direct and indirect measures, with an emphasis on length, area, perimeter, circumference, volume and angle measure. These students should be able to perform basic measurements with precision and accuracy. They should know how to solve problems involving rates and units of measurement, including conversion within and between measurement systems.

To demonstrate at least minimal preparedness in **geometry,** students should be able to use two-dimensional representations of three-dimensional objects to visualize and solve problems. They should be able to analyze properties and relationships of parallel, intersecting or perpendicular lines. Students should be able to use properties and relationships of geometric figures, including the Pythagorean Theorem, to solve problems.

To demonstrate at least minimal preparedness in **data analysis and statistics,** students should be able to organize and display data in a spreadsheet or table in order to solve problems and be able to read and interpret tables and graphs, such as line graphs and bar charts. Additionally, these students should be able to interpret and analyze uses of data in practical applications, and distinguish relevant from irrelevant information. Students should be able to use or interpret the mean and range of a set of data.

To demonstrate at least minimal preparedness in **algebra**, students should be able to write and evaluate or solve simple algebraic expressions, equations, or inequalities to represent a situation and solve problems.

Minimally prepared students should be able to solve multi-step application problems both within and across the five content areas.