



2014 PSAE Mathematics

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PSAE Contractor

- ACT is ISBE's primary contractor for the PSAE.
- Pearson is ACT's subcontractor for PSAE Day 2 test materials.



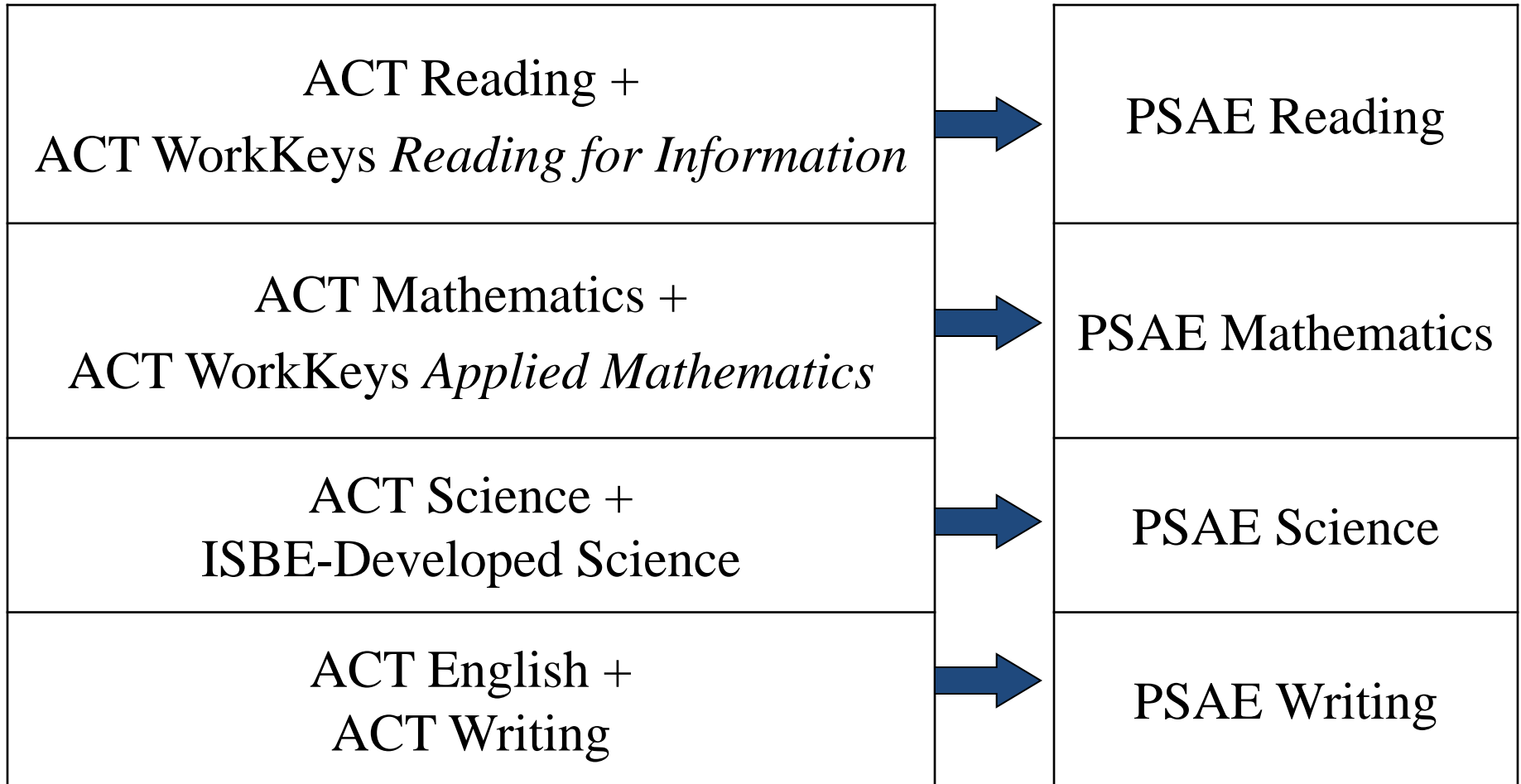
Purpose of PSAE

The major purpose of the PSAE is to measure the **Illinois Learning Standards** in the following areas: **Reading, Mathematics, Science, and Writing.**

Scores for and participation of grade 11 students contribute to school, district, and state Adequate Yearly Progress (AYP).



Test Components





PSAE Day 1 Standard-Time Test Administration Schedule

Wednesday, April 23, 2014

- ACT English Test – 45 minutes (75 questions)
- ACT Mathematics Test – 60 minutes (60 questions)
[required 15-minute break]
- ACT Reading Test – 35 minutes (40 questions)
- ACT Science Test – 35 minutes (40 questions)
[required 5-minute break]
- ACT Writing – 30 minutes (1 essay prompt)



PSAE Day 2 Standard-Time Test Administration Schedule

Thursday, April 24, 2014

- ISBE-Developed Science— 40 minutes
(45 questions)
- ACT WorkKeys *Applied Mathematics*— 45 minutes
(33 questions)
[required 15-minute break]
- ACT WorkKeys *Reading for Information*— 45 minutes
(33 questions)
- ACT WorkKeys *Locating Information* – 45 minutes
(38 questions) *Optional per district decision-not part of PSAE*



PSAE Day 1 and Day 2 Standard-Time Makeup Test Administration Schedule

- Standard-time makeup testing –
May 7 - 8, 2014 (Day 1 and/or Day 2)
- Different (but equivalent) forms used for makeup testing
- Same test administration schedule as initial standard-time testing in April



PSAE Accommodations Test Administration Schedule

- Day 1 accommodations testing window –
(as early as) April 23, 2014, until (as late as) May 7, 2014
- Day 2 accommodations testing window –
(as early as) April 24, 2014, until (as late as) May 8, 2014
- Different (but equivalent) forms used for accommodations testing



PSAE Day 1

ACT Mathematics

- 60 multiple-choice items in 60 minutes
- Problem solving in six areas: pre-algebra, elementary algebra, intermediate algebra, coordinate geometry, plane geometry and trigonometry
- Certain types of calculators may be used
To obtain the latest list of prohibited calculators, check the ACT Web site (www.act.org) or call 1.800.498.6481.



The ACT for mathematics contains questions that require the use of reasoning skills to solve practical problems in the following six areas:

- Pre-Algebra ($\approx 23\%$)
- Elementary Algebra ($\approx 17\%$)
- Intermediate Algebra ($\approx 15\%$)
- Coordinate Geometry ($\approx 15\%$)
- Plane Geometry ($\approx 23\%$)
- Trigonometry ($\approx 7\%$)



ACT: Pre-Algebra ($\approx 23\%$)

Questions in this content area are based on basic operations using whole numbers, decimals, fractions, and integers; place value; square roots and approximations; the concept of exponents; scientific notation; factors; ratio, proportion, and percent; linear equations in one variable; absolute value and ordering numbers by value; elementary counting techniques and simple probability; data collection, representation, and interpretation; and understanding simple descriptive statistics.



ACT: Elementary Algebra ($\approx 17\%$)

Questions in this content area are based on properties of exponents and square roots, evaluation of algebraic expressions through substitution, using variables to express functional relationships, understanding algebraic operations, and the solution of quadratic equations by factoring.



ACT: Intermediate Algebra ($\approx 15\%$)

Questions in this content area are based on an understanding of the quadratic formula, rational and radical expressions, absolute value equations and inequalities, sequences and patterns, systems of equations, quadratic inequalities, functions, modeling, matrices, roots of polynomials, and complex numbers.



ACT: Coordinate Geometry ($\approx 15\%$)

Questions in this content area are based on graphing and the relations between equations and graphs, including points, lines, polynomials, circles, and other curves; graphing inequalities; slope; parallel and perpendicular lines; distance; midpoints; and conics.



ACT: Plane Geometry ($\approx 23\%$)

Questions in this content area are based on the properties and relations of plane figures, including angles and relations among perpendicular and parallel lines; properties of circles, triangles, rectangles, parallelograms, and trapezoids; transformations; the concept of proof and proof techniques; volume; and applications of geometry to three dimensions.



ACT: Trigonometry ($\approx 7\%$)

Questions in this content area are based on understanding trigonometric relations in right triangles; values and properties of trigonometric functions; graphing trigonometric functions; modeling using trigonometric identities; and solving trigonometric equations.



Sample ACT Mathematics Item

In any parallelogram $ABCD$, it is always true that the measures of $\angle ABC$ and $\angle BCD$:

F. add up to 180° .*

G. add up to 90° .

H. are each greater than 90° .

I. are each 90° .

J. are each less than 90° .

ACT Subscore: GT (Plane Geometry/Trigonometry)



PSAE Day 2

ACT WorkKeys *Applied Mathematics*

- 33 multiple-choice items in 45 minutes
- Work-related problems
- Five levels of difficulty (Levels 3, 4, 5, 6, and 7)
- Certain types of calculators may be used
To obtain the latest list of prohibited calculators, check the ACT Web site (www.act.org) or call 1.800.498.6481.
- A formula sheet is provided



ACT Work Keys *Applied Mathematics* contains questions that require the use of reasoning skills and problem-solving strategies to solve practical problems found in the workplace.

- A formula sheet is provided
- A calculator may be used
- Five levels of difficulty (Levels 3-7)



Most of the problems in ACT WorkKeys *Applied Mathematics* will involve one or more of the following applications:

- **Quantity** - determining the number of items sold, produced, or purchased, or figuring totals on a per unit basis tasks involving monetary units include figuring sales, costs, wages, and expenses
- **Money** - tasks involving monetary units include figuring sales, costs, wages, and expenses
- **Time** - some tasks involve figuring elapsed time, converting time units
- **Measurement** - calculating distance, area, weight, and volume; conversions
- **Proportions and Percentages** - tasks that require making predictions, calculating commissions, discounts, taxes, price increases, changes in sales, and wage changes
- **Averages** - records may be expressed in terms of averages (sales records, wages, costs, hours worked)



ACT WorkKeys *Applied Mathematics* Assessment Level 3:

Individuals with Level 3 skills can set up and solve problems with single-step mathematical operations (addition, subtraction, multiplication, or division) on whole numbers, fractions, decimals, or percentages.

Example: It took you 1 hour to unpack, price, and shelve 3 boxes of jeans at work. On the average, how many minutes did it take to unpack, price, and shelve 1 box of jeans?

- A. 15
- B. 20 *
- C. 30
- D. 40
- E. 60



ACT WorkKeys *Applied Mathematics* Assessment Level 4:

Individuals with Level 4 skills can set up and solve problems with 2 or more different mathematical operations (addition, subtraction, multiplication, or division) on whole numbers, fractions, decimals, or percentages.

Example: The discount store where you work is selling a video game for 15% off the regular price of \$21.00. What is the sale price of the game?

- A. \$ 3.15
- B. \$16.80
- C. \$17.85 *
- D. \$18.90
- E. \$24.15



ACT WorkKeys *Applied Mathematics* Assessment Level 5:

Individuals with Level 5 skills can set up and solve problems with multiple-step calculations on a mixture of whole numbers, fractions, decimals, or percentages, when the information is presented in a logical order.

Example: You groom dogs. It takes you 1 hour 15 minutes to groom an average-sized dog. Large dogs, however, take 1 hour 45 minutes to groom. Today you have to groom 3 average-sized dogs and 2 large dogs. How much time should it take you to groom all 5 dogs?

- A. 3 hours
- B. 3 hours 45 minutes
- C. 6 hours 15 minutes
- D. 7 hours 15 minutes *
- E. 7 hours 45 minutes



ACT WorkKeys *Applied Mathematics* Assessment Level 6:

Individuals with Level 6 skills can set up and solve problems containing unnecessary information or information presented out of logical order and involving multiple-step calculations on a mixture of whole numbers, fractions, decimals, or percentages.

Example: You are preparing to tile the floor of a rectangular room that is $15\frac{1}{2}$ feet by $18\frac{1}{2}$ feet in size. The tiles you plan to use are square, measure 12 inches on each side, and are sold in boxes that contain enough tiles to cover 25 square feet. How many boxes of tiles should you order?

- A. 11
- B. 12*
- C. 34
- D. 59
- E. 287



ACT WorkKeys *Applied Mathematics* Assessment Level 7:

Individuals with Level 7 skills can set up and solve problems requiring extensive calculations and several conversions between systems of measurement. They can calculate percent change, set up & manipulate complex ratios and proportions, find multiple areas or volumes of 2- and 3-dimensional shapes, find the best economic value of several alternatives, and locate errors in multiple-step calculations.

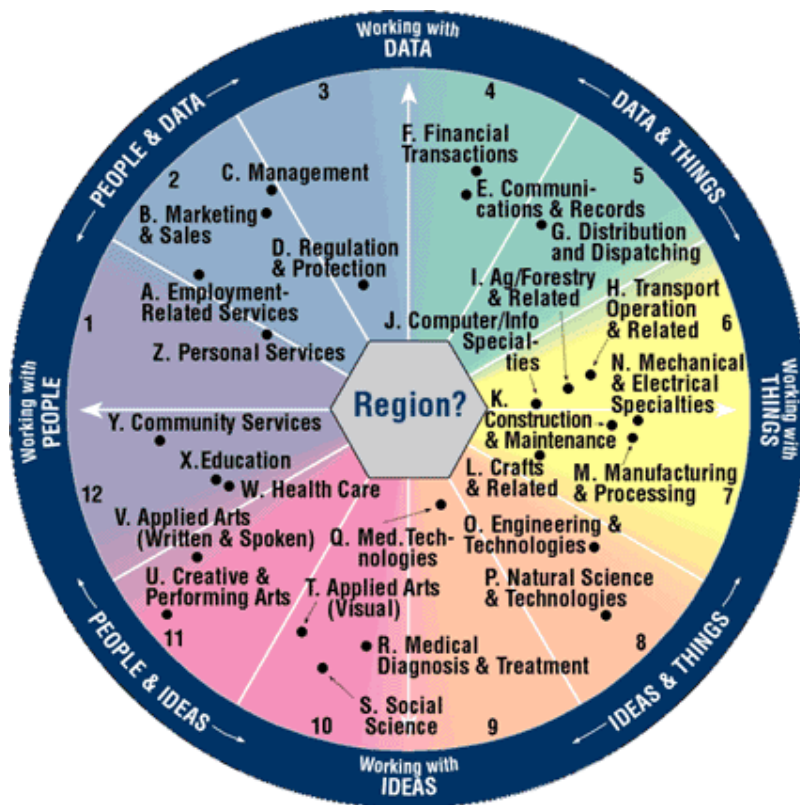
Example: The farm where you just started working has a vertical cylindrical oil tank that is 2.5 feet across on the inside. The depth of the oil in the tank is 2 feet. If 1 cubic foot of space holds 7.48 gallons, about how many gallons of oil are left in the tank?

- A. 37
- B. 59
- C. 73 *
- D. 230
- E. 294



World of Work Map: Applies WorkKeys Scores to Careers

www.act.org/wwm





• **Career Area X: Education**

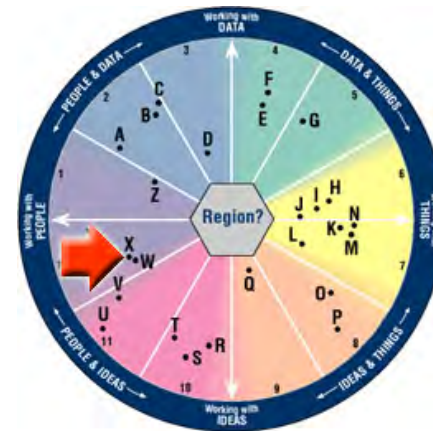
• **Examples of Occupations:**

Athletic Coach; Educational Administrator; Elementary/Secondary Teacher; Corporate Trainer.

• **Examples of majors/programs of study**

(years of study past high school):

Individual/Family Development Studies (2), General/Elementary/Secondary Teacher Education, Specialized fields (e.g., Music, Science) related to education (4). While it's important to know what kind of career you're interested in, it's also important to consider the **skill level** needed. **Education Profile**



Brian Vanderveer is a teacher in a middle school. He is responsible for teaching youth that have a variety of learning disabilities. He designs and modifies instruction to meet a student's special needs. He works closely with parents to inform them of their child's progress and suggest techniques to promote learning at home. He loves the challenge of working with his students and the freedom he has to find the best method to help students to learn. He dislikes not having enough time to dedicate to each student. He worries that he will eventually burn out because of the stress of teaching students with so many different needs.



Questions?

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