Power Up: Math ACT Prep, Week 9

Michell Eike, Teresa Lansford
Published by *K20 Center*

This work is licensed under a Creative Commons CC BY-SA 4.0 License

Time Frame 35 minutes

Essential Question(s)

How can I increase my ACT score?

Summary

In this activity, students will apply formulas common in secondary and early college-level mathematics in the context of a descriptive scenario. They will apply what they learned during "Power Up: Math ACT Prep, Week 8" to solve story problems that require formulas that are not given. Students will review common formulas used to solve ACT-style questions and apply that learning to practice questions in the style of ACT math problems. This is the ninth activity in a 10-week "Power Up" series for ACT prep.

Learning Goals

- Identify and algebraically represent critical information from a story problem.
- Apply formulas and problem-solving skills to story problems.

Attachments

- Activity Slides—Math ACT Prep, Week 9.pdf
- Activity Slides—Math ACT Prep, Week 9.pptx
- Exit Ticket—Math ACT Prep, Week 9.docx
- Exit Ticket—Math ACT Prep, Week 9.pdf
- Formulas and Stories—Math ACT Prep, Week 9.docx
- Formulas and Stories—Math ACT Prep, Week 9.pdf
- Formulas—Math ACT Prep, Week 9.pdf

Materials

- Activity Slides (attached)
- Formulas and Stories cards (attached; one set per pair; printed front only)
- Formulas handout (attached; one per student; printed front/back)
- Exit Ticket handout (attached; one per student; printed front only)
- Pencil
- Paper
- Highlighters
- Calculators

10 minutes

Introduction

Teacher's Note: ACT Enhancements

The following resource has been updated to better align with the test changes that began in April 2025 for the online test and in September 2025 for the paper-pencil test. Some outside resources linked are based on the previous version of the ACT. Learn more about enhancements to the ACT in 2025.

Teacher's Note: Activity Preparation

Before you begin, print the attached **Formulas and Stories** cards (one set per pair of students in your class). Consider printing on cardstock paper, especially if you plan to reuse these cards.

Once printed, cut out the cards. All of these cards are the same size for easy cutting. Use envelopes or paper clips to organize the cards. The cards will be used during the Activity portion.

Introduce the activity using the attached **Activity Slides**. Use the Bell Ringer strategy to begin class. Have students get their calculators; follow regular classroom procedures for this.

Once students have their calculators, display **slide 3** and have students independently answer the question on a piece of notebook paper or elsewhere if you have a classroom norm for bellwork. After a minute, ask for a volunteer to share how they answered the question. Share that the answer is **A**. Use **slide 4** if you need to review a sample response.

Show **slide 5** and facilitate a brief discussion over the steps for solving a story problem from "Power Up: Math ACT Prep, Week 8": (1) drawing a quick sketch, (2) labeling the known, (3) labeling the unknown, and (4) writing an equation. Then ask the class what they think would be helpful for that last step of writing equations. If the response of "knowing formulas" is not quickly shared, ask the class what they needed to know to complete the Bell Ringer (that the problem did not give them). They needed to know the formula for slope.

Share the essential question on **slide 6** and the learning objectives on **slide 7**.

15 minutes

Activity

Have students find a partner or assign partners, then display **slide 8**. Let students know that there are a lot of formulas that they will need to know for the ACT. It is impossible to give students a complete list of formulas that will be **needed** for the ACT, as the ACT has a variety of questions. Often a formula needed on the last exam is not needed for the following exam. Explain that the formulas on the cards they are about to see are some of the most common formulas on the ACT that are not otherwise part of this activity series.

Remind students that they already know many formulas that they will likely need for the ACT. For example, they know how to find the perimeter and area of a rectangle; they know the quadratic formula (from Algebra 2); they used the formula for slope to answer the Bell Ringer. Again, be encouraging—it may feel like they need to know so much, but they already do! Their confidence and attitude towards the ACT plays a key role in their performance.

Let them know that today, they will see some formulas that they may remember and some that might be new to them. Give each pair a set of the attached **Formulas and Stories** cards and introduce them to the Card Matching strategy. Direct students to match each story card with the formula card they think is the best match.

Teacher's Note: Formulas on the ACT

There are 45 questions on the math section of the ACT. An analysis of the frequency of a topic (or formula) was used to pinpoint content for this 10-week "Power Up" series. The formulas on these cards do not include formulas from other weeks of this series nor formulas that are often taught during a traditional Algebra 2 course in order to cover as much content as possible.

- "Power Up: Math ACT Prep, Week 3" addressed perimeter and area of rectangles.
- "Power Up: Math ACT Prep, Week 4" addressed probability.
- "Power Up: Math ACT Prep, Week 10" will address right-triangle trigonometry.

After 2-3 minutes, depending on how quickly the class is completing the card matching, tell students that they have one more minute to finalize their card matching. Give each student a copy of the attached **Formulas** handout and a highlighter. Then transition to **slide 9**. Direct students to check their card matches with their handout. Have students use a highlighter to highlight on their handout (not on the cards) what part of the story problem prompted them to match it with that formula. Ask for different volunteers to share how they knew which formula to match with each story problem. Ask the class which formulas they remembered, had forgotten or had not seen in a while, or if any were new. Let students know that the ACT assesses a lot of secondary mathematics content, so it is likely that they will not know all of the formulas needed to answer every question. For example, students in Algebra 2 may not be familiar with the Law of Sines since that is traditionally taught during a Precalculus course, but there may be a question on the ACT asking students to use that formula. For new or forgotten formulas, spend time explaining to the class more details about that formula.

- $D = R \cdot T$ is distance = rate · time. Let students know rate is also referred to as average speed because it is the "rate" at which one travels a certain distance during a certain time.
- Remind students of the difference between the circumference and area of a circle. Also let students know that they do not need to memorize the formula for the area of a triangle, because a triangle is just half of a rectangle; they already know the formula for the area of a rectangle.
- The "formulas" for measures of central tendency are sometimes considered more "math facts" than "formulas," but remind students of the difference between mean, median, and mode.
- Combinations and permutations are likely new formulas for students. However, let them know that they do not need to memorize the formulas; instead, show them how to use their calculator for this. If students can pick between combinations and permutations, then their calculator can help them with the calculations.
- Lastly, remind students how to find the volume of any prism: the area of the base times the height of the prism.

Encourage students to make notes on their handout as the class reviews each new formula. There is extra space at the bottom of the back of their handout for them to write any formulas they personally struggle to remember that are not already listed; they will return to this during the Wrap-Up.

Show **slide 10** and give students some advice for the ACT: *if you forget a formula, make a guess, make a mark (bookmark) the question to later return to, and then move on to the next question*. Consider also sharing that, similarly, if a formula is given, but one is unsure how to solve for the unknown, using guess and check with the answer choices is a good approach.

10 minutes

Wrap-Up

Display **slide 11** and use the Exit Ticket strategy to individually assess what students have learned. Explain to students that they will have five minutes to answer five questions. Give each student a copy of the attached **Exit Ticket** handout and have students keep their paper face down until you start the timer. Once everyone has a copy of the handout, tell them to turn their paper over. Start the 5-minute timer on the slide.

After the time expires, show **slide 12** and review the answers with the class. Remind students that the ACT is not designed for everyone to earn a perfect score and that it is okay if they only answered approximately half of the questions correctly on this assessment.

Show **slide 13** and direct students' attention to the bottom of the back of their Formulas handout. Direct students to write down any formulas or math facts that they forgot or did not know or that are not already listed on the handout, as the class reviews the questions from the Exit Ticket handout. Use **slides 14-20** as needed to review the work for the given questions.

Teacher's Note: Question 4

Students are likely to feel frustrated by this question due to the distracting note: *The positions of the **unselected** costumes do not matter.* This statement is extra, unneeded information. The ACT tests to see if students can extract only the needed information from a story problem.

Before you dismiss, show **slide 21**: *You Powered Up!* and remind students to practice the action they selected on their Goal Setting handout from week 1. Encourage them to add an action of "memorizing and applying formulas" if this is an area in which they would like to improve.

Additional Resource

As of April 28, 2025, the following practice test uses the 60 questions in 60 minutes format. Although the linked practice test and explanations are not aligned to the recently updated ACT (45 questions in 50 minutes), we believe they are still excellent resources and recommend you continue to suggest them to students.

Provide students the following practice test from Magoosh: act.magoosh.com/act-practice-test. This is a practice test where students will need paper to record their answers or would need to print the last page, the answer sheet, to practice bubbling in their choices.

What is great about this resource is that when students are done, they can click on the "View Explanations" button on the second to last page. This sends them to the ACT Practice Test PDF Explanations. The page contains video explanations for most of the questions from the practice test, so this is a great resource for students wanting to customize their learning.

Research Rationale

Standardized testing in high schools has long stood as a metric for assessing college readiness and school accountability (McMann, 1994). While there has been debate surrounding the accuracy of such metrics, as well as concerns regarding fairness, many institutions of higher education continue to make these scores part of the admissions process (Allensworth & Clark, 2020; Black et al., 2016; Buckley et al., 2020). Aside from admissions, it is also important to keep in mind that standardized test scores can also provide students with scholarship opportunities they wouldn't otherwise have (Klasik, 2013). Though the topic of standardized testing continues to be debated, effective test prep can ensure that our students are set up for success.

With several benefits to doing well on college admissions tests, it is important to consider how best to prepare students for this type of high stakes test. Those students from groups that may historically struggle to find success, such as those in poverty or first generation college students, especially stand to benefit from effective test preparation (Moore & San Pedro, 2021). The American College Test (ACT) is one option students have for college admissions testing that is provided both at national centers and school sites. Taking time to understand this test including the timing, question types, rigor, and strategies for approaching specific questions can help to prepare students to do their best work on test day and ensure their score is a more accurate representation of what they know (Bishop & Davis-Becker, 2016).

Resources

- Allensworth, E. M., & Clark, K. (2020). High school GPAs and ACT scores as predictors of college completion: examining assumptions about consistency across high schools. Educational Researcher, 49(3), 198-211.
- Bishop, N.S. & Davis-Becker, S. (2016). Preparing examinees for test taking: guidelines for test developers and test users. 2nd edition. Crocker, L. (Ed). In Handbook of test development (pp. 129-142). Routledge.
- Black, S. E., Cortes, K. E., & Lincove, J. A. (2016). Efficacy versus equity: what happens when states tinker with college admissions in a race-blind era? Educational Evaluation and Policy Analysis, 38(2), 336–363. http://www.jstor.org/stable/44984542
- Buckley, J., Baker, D., & Rosinger, K. (2020). Should state universities downplay the SAT?. Education Next, 20(3).
- K20 Center. (n.d.). Bell ringers and exit tickets. Strategies. https://learn.k20center.ou.edu/strategy/125
- K20 Center. (n.d.). Card matching. Strategies. https://learn.k20center.ou.edu/strategy/1837
- K20 Center. (2021, September 21). K20 Center 5 minute timer. [Video]. YouTube. https://youtu.be/EVS_yYQoLJg?si=fJvuvFWH3vJ3B0z9
- Klasik, D. (2013). The ACT of enrollment: the college enrollment effects of state-required college entrance exam testing. Educational Researcher, 42(3), 151–160. http://www.jstor.org/stable/23462378
- McMann, P. K. (1994). The effects of teaching practice review items and test-taking strategies on the ACT mathematics scores of second-year algebra students. Wayne State University. https://www.monroeccc.edu/sites/default/files/upward-bound/McMannP.-the-effects-of-teaching-practice-review-items-ACT-mathematics-second-year-algebra.pdf
- Moore, R., & San Pedro, S. Z. (2021). Understanding the test preparation practices of underserved learners. ACT Research & Policy. Issue Brief. ACT, Inc. https://files.eric.ed.gov/fulltext/ED616526.pdf