Power Up: Math ACT Prep, Week 8

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Time Frame 35 minutes

Essential Question(s)

How can I increase my ACT score?

Summary

In this activity, students will learn how to approach story problems to make them less intimidating. Students will then apply their learning to a set of ACT-style math problems. This is the eighth activity in a 10-week "Power Up" series for ACT prep.

Learning Goals

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

Attachments

- Activity Slides—Math ACT Prep, Week 8.pdf
- Activity Slides—Math ACT Prep, Week 8.pptx
- Exit Ticket—Math ACT Prep, Week 8.docx
- Exit Ticket—Math ACT Prep, Week 8.pdf
- Story Problems—Math ACT Prep, Week 8 - Spanish.docx
- Story Problems—Math ACT Prep, Week 8 - Spanish.pdf
- Story Problems—Math ACT Prep, Week 8.docx
- Story Problems—Math ACT Prep, Week 8.pdf

Materials

- Activity Slides (attached)
- Story Problems handout (attached; one per student; printed front only)
- Exit Ticket handout (attached; one per student; printed front only)
- Pencil
- Highlighters (2 per student)
- Paper
- Calculators

5 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.

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

Once students have their calculators, move to **slide 3** and have students find the error. On this slide, students are given an ACT-style problem with student work shown and what that student typed into a calculator. Give students a minute or two to think independently, then ask for volunteers to share what they found to be incorrect.

As time allows, facilitate a discussion about what was incorrect but also what was correct about the work that the student did. For errors, ask students how they could fix this student's mistake.

Sample Student Responses:

- They typed their work into the calculator wrong for g(0). They should have closed the parentheses after the 3, then put them around the 0 + 7.
- This mistake could also have been avoided by plugging in zero by hand. Zero minus three and zero plus seven is pretty easy.
- They typed their work into the calculator wrong for h(0). They forgot to close their parentheses after that 0.
- This mistake could have been avoided by remembering that this quadratic equation is in standard form and that the constant is the y-intercept.

Share the essential question on **slide 4** and the learning objectives on **slide 5**.

20 minutes

Activity

Display **slide 6** and help create a safe space by letting students know that it is common to be intimidated by a problem full of words. Then explain that it is rare to be given an algebraic problem without context and be asked to solve it in the real world. Remind them that in the real world, they are asked to be problem-solvers and to identify the critical information from a situation and use that information to solve problems.

Display **slide 7** and give each student a copy of the attached **Story Problems** handout. Let the class know that the goal today is to make story problems less scary which can be done by following a few steps: (1) drawing a quick sketch, (2) labeling the known, (3) labeling the unknown, and (4) writing an equation. These steps are on the handout and have more details on the following slides.

Show **slide 8** and explain step 1: *Draw a Quick Sketch?* This step has a question mark because it is not always a step you need to successfully solve a problem. However, if it would be helpful to draw a sketch, it is where one should start. Explain to students that the goal is to not need to re-read the problem, so as they read, if they start to construct a mental image, because they are reading about a shape, for example, then they should sketch that mental image. The mental image is likely a geometric shape, but occasionally, it might be an arrow as a reminder of the direction north or to indicate that something is getting bigger or smaller.

Move to **slide 9** and explain step 2: *Label the known.* Students need to underline or label, often by writing that some letter equals some numerical value or expression, the given information from a problem. On a paper-based test, underlining that information is helpful, but often students are taking a digital test, where underlining is a less helpful approach.

Teacher's Note: Online vs. Paper Testing

Keep in mind that there are different approaches to paper-based tests and tests on a computer screen; however, the concept of labeling the known should be used with any format. Underlining text on a piece of paper is often easiest, so regardless of the format of a later test, underlining text on paper is the best way to start teaching students how to identify critical information within a story problem. When the skill of identifying critical information is mastered, then students can read a question on a computer screen and jot down notes of critical information as they read.

Display **slide 10** and explain step 3: *Label the unknown.* The unknown is what the problem is asking the reader to find; it is what the question is asking for. Labeling this, often as a letter or word equals a question mark, helps avoid the need to re-read the problem.

Show **slide 11** and explain step 4: *Write an equation.* The goal is for students to use the known information from step 2 and the unknown question from step 3 together to write an equation that relates those pieces of information. For example, if a problem gives information about an initial value and a rate of change and is asking about the value at a certain time, then one might use the slope-intercept form of a line equation to relate that known and unknown information.

Move to **slide 12** and have students read question 1. Ask the class if they think it would be helpful to draw a quick sketch.

Transition to **slide 13** and show students that a helpful sketch would be of a rectangle and the diagonal of the rectangle. Let students know that it does not matter which diagonal they draw (top-left to bottom-right or bottom-left to top-right). Introduce students to the Categorical Highlighting strategy. Give each student two different colored highlighters. Explain that they are to use one color to highlight the known (step 2) and another color to highlight the unknown (step 3). Have students try this on their own.

After a minute, show **slide 14** and ask students to compare what they highlighted with what is underlined on the slide. Give students time to reflect and ask questions.

Now ask students to read and solve the problem using steps 1-4. After a minute, show **slide 15** so that students can check their work. If students have questions, ask them to keep them for just a bit and maybe jot them down, as the following slides will go through the problem in more detail.

Show **slide 16** and explain to students that there is a difference between what they should think and what they should write on the ACT. Since it is a timed exam, students should not show as much work as they would for class. Use the following slides to help students compare what they think and what they write.

Display **slide 17** and explain that there are two columns. On the left is what the students are reading and on the right is what students should be writing. Help students understand that when they read the first sentence of this problem, they should be prompted by the word "rectangular" to use step 1 to sketch a rectangle. They should be prompted by the word "diagonal" to sketch the diagonal of the rectangle. Then use step 2 to label the diagonal "84.1."

Move to **slide 18** and explain that when they read the first part of the second sentence, they should use step 2 to label the width of the rectangle "74."

Show **slide 19** and explain that they are still using step 2 to label the height of the rectangle "34 feet less than the width." This might look like an equation with variables: $h = w - 34$ or a simplified expression with just numbers: 74 – 34 = 40. Both are good approaches.

Transition to **slide 20** and explain that students are now using step 3 to label the unknown: *area*. This can easily be written as "A = ?" or "Area = ?"

Now show **slide 21** and explain that at this point students are ready for step 4: finding an equation that relates the known information of the diagonal, width, and height of a rectangle with the area. Let students know that sometimes they are given too much information, like the diagonal length in this problem. Encourage students to not waste time erasing "extra" information. On the ACT, there are sometimes sets of questions that all refer to the same given problem. What is "extra" information on one question may be valuable information on the next question. Help them also notice that the words in the problem were not the traditional "length and width" or "base and height," which is why it is important to have a flexible understanding of *area* like they learned during the third week of this activity series. So they now need to write an equation, which may include variables or may not: $A = b \cdot h$ or $A = (74)(40)$. Then they solve for A, which is 2,960 square feet.

Finish this problem by showing **slide 22** and letting them know that the correct answer choice is **D**. At this point, students may feel like this was a lot of work. Remind them that it is a lot of work to explain all of the thinking that goes on, but thinking itself does not take anywhere near as much time.

Show **slide 23** and have students independently try question 2. Tell them to not worry about pacing right now and go through the same steps as they did for question 1: use the highlighters to identify their known(s) and unknown(s). Then read the problem again and practice steps 1-4. Remind students to practice doing the steps as they read the problem.

After a couple of minutes, ask students to share with a partner and discuss their work. After pairs have had some time to discuss, display **slide 24** so that students can check their work. Have students help identify the steps used in solving this problem. Give students time to reflect and ask questions.

If time allows, ask for volunteers to share with the class what they found helpful and what they still find challenging. Facilitate a discussion so that students can share their approaches and help each other find success.

Sample Student Responses:

- I find it difficult to read quickly.
- I am getting faster at reading the more I read.
- I find it better to re-read the question and get it right. Maybe I don't get to read all of the questions, but at least I know that this one will be correct.
- Now that we have steps to follow, I feel like these story problems are not too bad.
- I don't really see pictures in my head, so I wasn't sure what to draw, but seeing my partner's work helped.

10 minutes

Wrap-Up

Display **slide 25** 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 **Exit Ticket** handout (attached) and have students keep the 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 26** 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.

Use **slides 27-32** as needed to review the work for the given questions.

Before you dismiss, show **slide 33**: *You Powered Up!* and remind students to practice the action they selected on their Goal Setting handout from week 1.

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 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

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