

**Subject area/course:** Mathematics/Algebra II

**Grade level/band:** 11

**Task source:** Center for Collaborative Education (CCE); Primary Author: Devin McNelly

## Which is a Better Deal?

### TEACHER'S GUIDE

#### A. Task overview:

The essential question that this task poses to students is: How can I become a well-informed, cost-conscious consumer of goods and services using my mathematical skills? In this task, students have the opportunity to choose a good or service that they would like to purchase. After researching prices for that good or service, they will create a model of the rates for the given services/goods being evaluated with a system of equations. They should analyze a solution (e.g., compare the slopes, the y-intercept) in order to create a report that analyzes a "better deal" between two comparable services/goods. Then, the student will construct a cost/benefit analysis: What are the benefits (tangible and intangible) of each choice? What are the costs (tangible and intangible)? Finally, they will present their findings to "the public" (e.g., their classmates).

#### B. Aligned standards:

##### 1. Common Core State Standards

[CCSS.Math.Content.HSA-REI.A.1](#) Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

[CCSS.Math.Content.HSA-REI.C.6](#) Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

[CCSS.ELA-Literacy.SL.11-12.2](#) Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.

##### 2. Critical abilities

Communication in Many Forms: Use oral and written communication skills to learn, evaluate, and express ideas for a range of tasks, purposes, and audiences. Develop and strengthen writing as needed by planning, revising, editing, and rewriting while considering the audience.

Modeling, Design, and Problem Solving: Use quantitative reasoning to solve problems arising in everyday life, society, and the workplace, e.g., to plan a school event or analyze a problem in the community, to solve a design problem or to examine relationships among quantities of interest. Plan solution pathways, monitoring and evaluating progress and changing course if necessary, and find relevant external resources, such as experimental and modeling tools, to solve problems. Interpret and



evaluate results in the context of the situation and improve the model or design as needed.

### 3. Other standards

New Hampshire DOE Math Competency 6: Students will demonstrate the ability to create and use algebraic models to connect mathematical concepts and properties when solving real-world problems.

New Hampshire DOE Math Competency 7: Students will demonstrate the ability to explain and justify reasoning when solving equations, inequalities, and systems of equations.

New Hampshire DOE Math Competency 9: Students will demonstrate the ability to build functions that model relationships between two quantities.

### C. Time/schedule requirements:

It is recommended that, prior to this summative assessment, students be assessed using the following:

- After week 1 of instruction: Formative assessment on slope and y-intercept
- After week 2 of instruction: Formative assessment on graphing equations
- During weeks 3 and 4: The present 7-day summative assessment: *Which is a Better Deal?*

### D. Materials/resources:

- Students will need access to the Internet to do their research.
- Graph paper and/or access to Microsoft Excel

### E. Prior knowledge:

Students should:

- Be familiar with slope and y-intercept
- Be able to graph equations by hand and/or using Excel or other graphing technology
- Have some experience presenting orally

### F. Connection to curriculum:

This task should take place following a unit on slope, y-intercept and graphing equations. The task ties directly to math curriculum, and the teacher could use this task to assess local economics standards.

### G. Teacher instructions:

Below is a proposal for a seven-day time frame for this project. Teachers may choose to facilitate this unit for seven consecutive days, or any other time frame that makes the most sense to them given the composition of the students, the demands of the curriculum, and other factors unique to teaching at the school.

**Day 1:**

- Provide overview of project and lead Q & A Session with students to check for student understanding of project.
- Facilitate whole class brainstorming session about possible goods and services that students can research.
- If time allows, have students start doing research.

**Day 2:**

- Students start/continue research.
- Have short (2-3 minute) individual conferences with students to assess engagement with project.
- Facilitate whole class "popcorn" session in which students share their ideas about goods/services they are researching.

**Day 3:**

- If time is needed, allow students to continue their research efforts on goods/services.
- Provide short review of mathematical thinking skills students need to demonstrate on project.
- Give students time to organize information collected and to prepare for analysis. (Students who are ready to do analysis can focus their efforts there.)
- Have individual conferences with students who need additional assistance.

**Day 4:**

- If time is needed, allow students to continue their efforts to analyze information.
- Facilitate whole class discussion on requirements of oral presentation.
- Provide time for students to create report.
- Have individual conferences with students to assess progress/performance on project.

**Day 5:**

- If time is needed, allow students to continue their efforts creating report.
- Provide time for students to practice oral presentation (work in small groups and/or with teacher).
- Have individual conferences with students who need additional assistance.

**Days 6-7:**

- Students present "lab report" to class (3 minutes/presentation - 2.5 minutes for presentation, 0.5 minute for Q&A).

**H. Student support:**

- Teacher and student conference around the research the student has done and goods/services the student will compare.



- Teacher observation protocol: Teacher observes student participation on the assignment and provides feedback and support, as needed, to keep individual on track.
- Provide a graphic organizer for report if needed.
- Instruction should take place in multiple modalities (e.g., visual, auditory, hands-on).
- Depending on individual student needs, you may provide additional time to complete the task.
- Provide supplementary materials to ensure student understanding of requirements for success on task (e.g., visual aids, captioned videos, audio recordings, etc.).
- Teacher and SPED/ELL specialist may co-teach area of challenge in order to ensure student understanding.

**I. Scoring:**

Student work can be scored using the Math Performance Assessment Rubric.

