



Transition Tasks

for Mathematics

Grade 8

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CCGPS Crosswalk

The following crosswalk is provided for use in selecting appropriate transition tasks that correspond to the CCGPS mathematics unit being taught. The unit number and title as outlined in the Grade 8 CCGPS curriculum map are shown in the first column, followed by the corresponding transition task. The Common Core Georgia Performance Standard addressed in that task is given, along with the page number where the task may be found.

| Unit number and title | Transition task | CCGPS addressed | Page number |
|-----------------------------------------------------|---------------------------------------------------|------------------------|--------------------|
| Unit 1: Transformations, Congruence, and Similarity | Gamers for Life | MCC8.G.2 | 44 |
| Unit 2: Exponents | Mowing Lawns | MCC8.NS.1 | 1 |
| Unit 2: Exponents | How Many Times in a Millennium? | MCC8.EE.3 | 7 |
| Unit 2: Exponents | Cell Phone Plans | MCC8.EE.7a | 35 |
| Unit 3: Geometric Applications of Exponents | Get the Robot on the Stage | MCC8.G.7 | 52 |
| Unit 3: Geometric Applications of Exponents | Out of This World | MCC8.G.9 | 59 |
| Unit 5: Linear Functions | How Much Money Will I Save? | MCC8.EE.5 | 15 |
| Unit 5: Linear Functions | Rolling Tennis Balls | MCC8.EE.5 | 27 |
| Unit 6: Linear Models and Tables | Effects of Urbanization and Logging on Watersheds | MCC8.SP.1 | 66 |

Mowing Lawns

Common Core Georgia Performance Standard

MCC8.NS.1

Task Overview

Background

Prior to this task, students should have had experience with operations with rational numbers. They should also have experience with ordering rational numbers and with converting decimal expansions into rational numbers. They should know that numbers that are not rational are called irrational.

Having to calculate values using a fractional multiplier in some way is a common real-world application. Being able to convert between decimal and fractional numbers can help students order different numbers. Understanding that the decimal expansion of a rational number eventually repeats is an important building block in the area of number sense.

This task is designed to give students the opportunity to work with rational numbers and their decimal expansions in a real-world context of calculating fees.

The task also provides practice with:

- operations with rational numbers
- creating and solving proportions
- comparing rational numbers

Implementation Suggestions

Students may work individually, in pairs, or in small groups to complete one or both parts of the task. Alternatively, students may meet in groups to share their results and reflect after individually completing the task, before a class-wide discussion.

Students may use one of the online resources for instruction or review on operations with rational numbers.

MCC8.NS.1 Task • The Number System

Mowing Lawns

Instruction

Introduction

Introduce the task by asking students if they have ever completed small jobs for neighbors or relatives. Did they charge a fee for the services? Was that fee based on an hourly rate or was it a flat fee? Have they ever calculated the fee based on prior jobs? What mathematical operations need to be used in order to calculate fees?

Monitoring/Facilitating the Task

Ask questions and prompt student thinking so that they:

- Recognize the mathematical operations they are using, considering which operations are required to complete the different parts of the task.
- Recall the procedures for performing operations with rational numbers.
- Consider how their answer should relate to the question before performing the actual mathematical operation.
- Recognize that a decimal expansion that terminates actually does repeat (with zeros) and fits the definition of a rational number.
- Understand that when rounding for this exercise, they round up to the nearest hundredth. Since they're calculating fees for a business, rounding down would cost the business money.

Debriefing the Task

- Have students explain the steps they used in determining the fee for each lawn described.
- Encourage students to share their results.
- Discuss the idea of decimal expansions and look at specific examples.
- Urge students to share where they had difficulty and how they resolved their questions.
- Allow students to share their own experiences with calculating fees.
- Ask students to explore how this task can relate to their life outside of the math classroom.

MCC8.NS.1 Task • The Number System

Mowing Lawns

Instruction

Answer Key

- One possible method is to set up a proportion to solve for the unknown amount. Sample

answer: $\frac{10}{\frac{1}{2}} = \frac{x}{\frac{1}{3}}$. Students could also consider a fee of \$20 for mowing one acre and then divide \$20 by $\frac{1}{3}$.

- | | | | | | | | | | |
|--------------------------|------|------|-----|-----|------|------|-----|------|------|
| Lawn size (acres) | 1/2 | 1/3 | 1/4 | 1/5 | 1/6 | 1/7 | 1/8 | 1/9 | 1/10 |
| Fee as a ratio | 10/1 | 20/3 | 5/1 | 4/1 | 10/3 | 20/7 | 5/2 | 20/9 | 2/1 |

- | | | | | | | | | | |
|--------------------------|-------|------|------|------|------|------|------|------|------|
| Lawn size (acres) | 1/2 | 1/3 | 1/4 | 1/5 | 1/6 | 1/7 | 1/8 | 1/9 | 1/10 |
| Fee (\$) | 10.00 | 6.67 | 5.00 | 4.00 | 3.34 | 2.86 | 2.50 | 2.23 | 2.00 |

- One possible method is to set up a proportion to solve for the unknown amount. Sample

answer: $\frac{10}{\frac{1}{2}} = \frac{x}{0.125}$. Students could also consider a fee of \$20 for mowing one acre and then multiply \$20 by 0.125.

- | | | | | | |
|-------------------------|-------|--------|------|-------|------|
| Lot size (acres) | 0.125 | 0.333 | 1.3 | 0.625 | 2.15 |
| Fee as a ratio | 5/2 | 333/50 | 26/1 | 25/2 | 43/1 |

- | | | | | | |
|-------------------------|-------|-------|-------|-------|-------|
| Lot size (acres) | 0.125 | 0.333 | 1.3 | 0.625 | 2.15 |
| Fee (\$) | 2.50 | 6.66 | 26.00 | 12.50 | 43.00 |

- Use a calculator to divide each ratio to verify that the decimals are equal.

Differentiation

Some students may benefit from the use of calculators during this task. Some students may benefit from the use of one of the online resources prior to or during the task. Students who complete the task early could create a fee chart using a new base fee.

Technology Connection

Students could create a spreadsheet that calculates each fee based on the price of \$10 per half acre.

MCC8.NS.1 Task • The Number System

Mowing Lawns

Instruction

Choices for Students

Following the introduction, offer students the opportunity to use their own rates for tasks such as babysitting, raking leaves, or performing other jobs. Encourage students to begin with a fraction, such as \$4 for $\frac{1}{2}$ hour of babysitting.

Meaningful Context

This task makes use of the real-world context of calculating fees. Many students will have to do this at some point in their lives. This task could be expanded by having students make a brochure with sample fees advertising a service of their choice.

Recommended Resources

- Math-Science Integration
www.walch.com/rr/CCTTG8OpsWithRationalNumbers
This site provides information about using operations with rational numbers and converting rational numbers to fractions.
- Proportions
www.walch.com/rr/CCTTG8Proportions
This site offers ten practice problems requiring the use of proportions to solve for an unknown value.
- Using Rational Numbers
www.walch.com/rr/CCTTG8UsingRationalNumbers
This site offers detailed instructions on how to perform operations with rational numbers, along with some practice examples.

NAME: _____

MCC8.NS.1 Task • The Number System

Mowing Lawns

Part 1

To promote your lawn mowing business, you have decided to create a brochure that advertises your fees for mowing lawns of various sizes. Your basic fee is \$10 for every $\frac{1}{2}$ acre mowed.

- Describe a method to determine your fee for a lawn that is $\frac{1}{3}$ of an acre.
- You want your brochure to include your fees for common lawn sizes. Determine the fee for each of the lawn sizes listed in the table below. Write your answer as a ratio.

| | | | | | | | | | |
|--------------------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Lawn size (acres) | $\frac{1}{2}$ | $\frac{1}{3}$ | $\frac{1}{4}$ | $\frac{1}{5}$ | $\frac{1}{6}$ | $\frac{1}{7}$ | $\frac{1}{8}$ | $\frac{1}{9}$ | $\frac{1}{10}$ |
| Fee as a ratio | $\frac{10}{1}$ | | | | | | | | |

- Now that you know your fee for each lawn as a ratio, use this information to determine the dollar amount for each size of lawn mowed. Write your answer as a decimal; decimals that extend beyond the hundredths place should be rounded up.

| | | | | | | | | | |
|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Lawn size (acres) | $\frac{1}{2}$ | $\frac{1}{3}$ | $\frac{1}{4}$ | $\frac{1}{5}$ | $\frac{1}{6}$ | $\frac{1}{7}$ | $\frac{1}{8}$ | $\frac{1}{9}$ | $\frac{1}{10}$ |
| Fee (\$) | 10.00 | | | | | | | | |

continued

NAME: _____

MCC8.NS.1 Task • The Number System

Mowing Lawns

Part 2

A nearby subdivision has heard of your business and would like a quote for each of the houses in the neighborhood. They have presented you with a lot map that includes the size of each parcel of land written in decimal form.

4. Describe a method to determine your fee for a lot of land that is 0.125 of an acre.

5. Determine the fee for each of the following lots of land. Assume that the acreage includes only areas that can be mowed. Write your answer as a ratio.

| | | | | | |
|-------------------------|-------|-------|-----|-------|------|
| Lot size (acres) | 0.125 | 0.333 | 1.3 | 0.625 | 2.15 |
| Fee as a ratio | | | | | |

6. Use the ratios you wrote in the previous table to determine the dollar amount you would charge for each lot size.

| | | | | | |
|-------------------------|-------|-------|-----|-------|------|
| Lot size (acres) | 0.125 | 0.333 | 1.3 | 0.625 | 2.15 |
| Fee (\$) | | | | | |

7. How can you verify that the rational number (in this case, the ratio) is equivalent to the decimal number?