

Working with Fractions – Remedial Lesson 3

Grade: Applicable Knowledge and Skills to All High School Math Courses

Subject: Remedial Math

Check out more at www.bjrichardsonmath.weebly.com

Driving Question: How do I multiply and divide fractions?

Purpose: Very few high school mathematics teachers would argue that students numeracy skills diminish when working with fractions. The goal of this lesson is to refresh or reteach students about multiplying and dividing fractions. This lesson will look at using equivalent fractions to explain both operations. An informal treatment of the reciprocal of a fraction is used in order to produce a more efficient method.

It should be noted that because these lessons are focused on remedial study, they will make brief attempts at understanding but ultimately strive for efficiency.

Prior Knowledge: Students should be aware of the natural, whole, and integer number systems, as well as basic arithmetic operations with these systems. Basic number sense is also assumed.

Ideally the students would have also studied the previous lessons or have a strong concept of what a fraction is, its parts, what an equivalent fraction is, how to create equivalent fractions through multiplication by a clever form of one, and the addition and subtraction operations (although not required).

For the understanding piece, students should be able to find the value of a fraction of a whole number, provided the whole number is divisible by the denominator of the fraction.

Screencast Link(s):

Multiplication of Fractions – <https://www.youtube.com/watch?v=kUeewYPov7q>

Division of Fractions - <https://www.youtube.com/watch?v=PJbTluH7yVk>

Expected Time: The design of this lesson is to be an individualized system of instruction, thus time would depend directly on the students' progress. If attempting as an entire class the lesson would likely take one 75-minute period (this includes assessment tasks).

Resources:
Requires Internet
Access
(Tools & Tech)

Lesson Procedure

Due to the nature of the lesson, the educator's role becomes addressing issues after the student has had time to work through the lesson. The resource in that sense is a truly flipped lesson, but the resources within could easily be used within a blended model.

I do: Assess the student's current skills with fractions and if required, direct the to the student instruction form.

Student Instruction Form:

If possible, find some time to go over the students assessments and show them how their difficulties with fractions are directly impacting the achievement of their outcomes. You may ask students to point out areas where fractions have cost them on the assessment. This provides the student and opportunity to find, analyze, and evaluate their skills with guidance.

find and validate – Let the students find areas on assessments that were difficult due to multiplying or dividing fractions

critically think and analyze – Look at what skills in particular would've benefited your ability to demonstrate understanding

collaborate and communicate - The teacher should direct the student to the remedial lesson and then both should trouble shoot any difficulties, technology or otherwise, the student might have in completing the lesson.

You do:

The students should began by watching the screencasts listed above.

The initial video will introduce them to multiplication and the second video through the concept of a reciprocal and then division of fractions.

The first video although it leads to a simpler 'rule', has a much more difficult explanation. It hinges on the idea that students can find fractions of whole numbers. By creating an equivalent fraction with a numerator that is divisible by the divisors numerator, we can produce the quotient and use the denominator of the fraction being divided to tell us what type of fraction the resulting quotient will be. (Difficult to write out, see the video example, it will make things clearer.) After attempting to explain the process, the general rule is given.

The second video again approaches the topic from an equivalent fractions standpoint. It shows students how division of equivalent fractions is simply division of whole numbers. Relating the denominator to the idea of a 'unit', division becomes less complex.

This video then introduces a reciprocal. The treatment of this concept is very light with no focus on understanding. After gaining the ability to create a reciprocal, the video shows how to use this concept to divide fractions.

Now the student needs time to assess their understanding. The following links will take the student to the Khan Academy. The activities that have

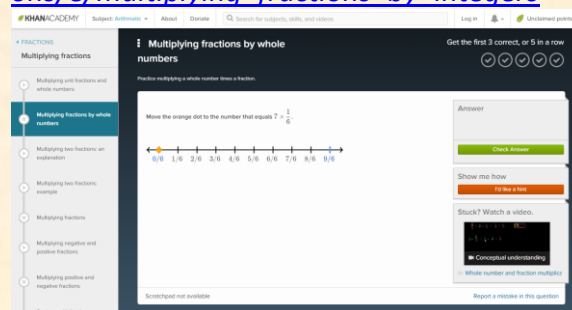
been selected should provide the necessary formative feedback and practice for the student to master the skills and knowledge.

Within these activities, the students are provided a series of questions. They are encouraged to try and get 5 in a row correct (reflecting understanding and possibly mastery). The students are provided a scratch pad option to write on, a hint button that provides help, and easy access to additional videos/examples to assist.

The students should attempt the activities until they feel they've reached a level of mastery...and then do a few more to be sure. The following screen shots and links show where to find the selected activities.

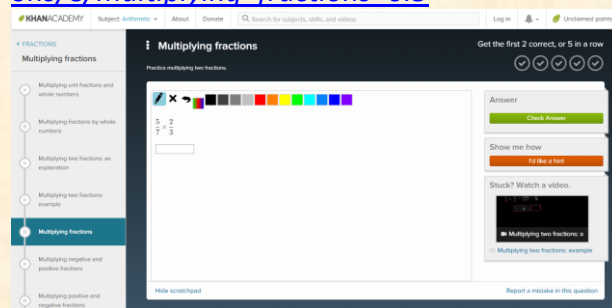
Multiplying Fractions by Whole Numbers:

<https://www.khanacademy.org/math/arithmetic/fractions/multiplying-fractions/e/multiplying-fractions-by-integers>



Multiplying Fractions:

<https://www.khanacademy.org/math/arithmetic/fractions/multiplying-fractions/e/multiplying-fractions-0.5>



Multiplying Positive and Negative Fractions:

<https://www.khanacademy.org/math/arithmetic/fractions/multiplying-fractions/e/multiplying-fractions>

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FRACOINS
Multiplying fractions

- Multiplying unit fractions and whole numbers
- Multiplying fractions by whole numbers
- Multiplying two fractions an explanation
- Multiplying two fractions example
- Multiplying fractions
- Multiplying negative and positive fractions
- Multiplying positive and negative fractions**
- Multiplying fractions word problems

Multiplying positive and negative fractions

Practice multiplying fractions. Fractions in these problems may be positive or negative.

Get the first 3 correct, or 5 in a row

Answer

Check Answer

Show me how

Fill in a hint

Stuck? Watch a video.

Multiplying negative and p

Multiplying two fractions example

Report a mistake in this question

Dividing Fractions by Fractions:

<https://www.khanacademy.org/math/arithmetic/fractions/div-fractions-fractions/e/understanding-dividing-fractions-by-fractions>

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FRACOINS
Dividing fractions by fractions

- Understanding division of fractions
- Understanding dividing fractions by fractions**
- Dividing fractions example
- Dividing fractions example 2
- Dividing fractions
- Dividing negative fractions
- Dividing positive and negative fractions
- Dividing fractions word problems

Understanding dividing fractions by fractions

Practice dividing fractions by fractions. Fractions in these problems may be positive or negative.

Get the first 4 correct, or 5 in a row

Fill in the blank to make the equation true:

$$\frac{14}{3} \div \frac{1}{5} = \frac{14}{3} \times \frac{\quad}{\quad}$$

Answer

Check Answer

Show me how

Fill in a hint

Stuck? Watch a video.

Understanding division of fractions

Dividing fractions example

Report a mistake in this question

Dividing Fractions II:

https://www.khanacademy.org/math/arithmetic/fractions/div-fractions-fractions/e/dividing_fractions_1.5

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FRACOINS
Dividing fractions by fractions

- Understanding division of fractions
- Understanding dividing fractions by fractions
- Dividing fractions example
- Dividing fractions example 2
- Dividing fractions**
- Dividing negative fractions
- Dividing positive and negative fractions
- Dividing fractions word problems

Dividing fractions

Practice dividing fractions by fractions. No negative numbers are used in this exercise.

Get the first 1 correct, or 5 in a row

Answer

Check Answer

Show me how

Fill in a hint

Stuck? Watch a video.

Dividing fractions example

Understanding division of fractions

Dividing fractions example 2

Report a mistake in this question

Dividing Positive and Negative Fractions:

https://www.khanacademy.org/math/arithmetic/fractions/div-fractions-fractions/e/dividing_fractions_2

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FRACOINS
Dividing fractions by fractions

- Understanding division of fractions
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- Dividing fractions example 2
- Dividing fractions
- Dividing negative fractions
- Dividing positive and negative fractions**
- Dividing fractions word problems

Dividing positive and negative fractions

Practice dividing fractions. Fractions in these problems may be positive or negative.

Reduce to lowest terms.

$$\frac{1}{2} \div \left(\frac{3}{4}\right) = ?$$

Answer

Check Answer

Show me how

Fill in a hint

Stuck? Watch a video.

Dividing negative fractions

Dividing fractions example 2

Report a mistake in this question

	<p><input type="checkbox"/> remember, understand, evaluate, leverage - the students are being asked to connect the knowledge and skills remembered from the screencasts to understanding the tasks in the activities. In solving the tasks of the activities, the students are leveraging the remembered knowledge to meet the goal. If they need additional support from the provided examples or supplementary videos, they must evaluate the information being presented before leveraging it.</p> <p><input type="checkbox"/> collaborate – the apps could easily be done in groups or with parents. The possibilities for collaboration exist. The ‘challenge’ idea mentioned above could easily be done in groups.</p>									
	<p><i>We do: On the student instruction form, there is a section where the student must submit up to five questions the student still has concerning the topic. The student should submit these to the teacher and when possible (extra help, during a work period, etc.) the teacher should address these.</i></p> <p><i>After this the student should complete a small creative piece demonstrating their understanding of the content. This piece should be something that can be shared either physically or electronically. The goal of the piece is for the student to step in the role of the educator and create something that they feel would help others who struggled as they did. If the student has completed a task like this from a previous lesson, they should be encouraged to choose a different method of presentation from there last OR combine multiple pieces into one larger resource.</i></p> <p><i>Some suggestions for creative pieces:</i></p> <table border="0"> <tr> <td><i>Screencast</i></td> <td><i>Show Me Composition</i></td> <td><i>Weebly or Blog Site</i></td> </tr> <tr> <td><i>PowerPoint / Prezi</i></td> <td><i>Poster</i></td> <td><i>NearPod Lesson</i></td> </tr> <tr> <td><i>A song/Poem</i></td> <td></td> <td></td> </tr> </table>	<i>Screencast</i>	<i>Show Me Composition</i>	<i>Weebly or Blog Site</i>	<i>PowerPoint / Prezi</i>	<i>Poster</i>	<i>NearPod Lesson</i>	<i>A song/Poem</i>		
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	<p><input type="checkbox"/> critically think, analyze, synthesize – the students need to critically analyze their understanding and skill to synthesize questions they still have.</p> <p><input type="checkbox"/> create – the students need to create a piece that demonstrates their understanding and can be used as a teaching tool for others.</p> <p><input type="checkbox"/> communicate – the piece that they develop has to communicate clearly their understanding and be accessible by those who would struggle with the topic also.</p>									
	<p><i>We share: The student should then meet with the teacher to receive feedback on it. If the piece is satisfactory, and if the student is comfortable, they should find a forum to share their piece. This could be accessible online or displayed in the classroom.</i></p>									

- collaborate, communicate** – the student should be able to communicate to all audiences what they have learned and how to apply the skills and knowledge.
- publish** – together, the teacher and student should find a way to publish the work if the student is comfortable.
- citizenship** – through sharing their work, the student is contributing to their classroom and other's education.

WRAP UP/REMINDERS: With respect to the creative piece developed by the student, the nature of this piece could easily be adapted. For example, the student may choose to demonstrate their knowledge of fractions, and then extrapolate this showing applications to asymptotic behavior in the curriculum. In this way the student is linking the remedial knowledge directly to applicable outcomes within your specified course.

Evaluation: Ideally, the teacher should see a reduction in the amount of fraction related errors that the student commits while attempting to demonstrate outcomes requiring this prerequisite knowledge.

Alternatives:

If students are not keen on the idea of video education or would benefit from a more text based approach, the following sites are recommended for their simplicity and content.

Multiplying Fractions – https://www.mathsisfun.com/fractions_multiplication.html

Dividing Fractions - https://www.mathsisfun.com/fractions_division.html