

LessonTitle: Operations with Fractions and Integers		Alg 1.2
Utah State Core Standard and Indicators Algebra Content Standards 1 Process Standards 1-4		
Summary		
In these activities, students use the calculator to solve problems using addition, subtraction, multiplication, and division with fractions and integers. They develop or review the rules for these operations with fractions and integers. Practice sheets are included.		
Enduring Understanding	Essential Questions	
Utilizing integers and fractions effectively is basic to success with the algebraic language.	Where do rules and formulas come from? How can we both understand and remember rules for operating with fractions and integers?	
Skill Focus	Vocabulary Focus	
<ul style="list-style-type: none"> • Operating on fractions (+, -, x, ÷) • Operating on integers (+, -, x, ÷) • Using basic functions on the calculator to help us understand the rules of operating on fractions and integers 		
Assessment		
Materials: TI-73 Calculators		
Launch ideas:		
“J had her students make three columns on the fraction worksheet. In the first column, they worked the problem by hand, in the second column they wrote the rule they used to solve the problem. Her students worked in pairs and discussed and wrote the rules together. When the first two columns were finished, she passed out calculators and the students checked their answers in the third column. This worked very well as a review. We talked about inquiry and decided you need more examples to truly find rules through inquiry.”		
Explore		
“We debated the pros and cons of letting students do all fractions on the calculator. On the Integer Inquiry lesson we talked about changing the question to “What have we learned about the rules for adding or subtracting etc integers? C talked about a teacher at his school that teaches multiplication and division of integers first, never changes subtraction to add the opposite and feels like the students have less trouble with signed numbers.”		
Summarize		
Apply		

Directions:

The fraction and integer operation activities are meant as an introduction or as a review. In an algebra course, they should be a review. Students work individually on calculators, but consult with their group. The teacher directs students in small groups and moderates the large group discourse about the calculator inquiry. Students should prepare presentations on the rules they developed.

Alg 1.2a Operating (+, -, x, ÷) on Fractions

Estimate the following fraction problems . Then do the problems on the calculator.
After you find the answers, record the rules for operating on fractions.

Problem	Estimate	Calculator Answer	Write what you must do to find the answer without the calculator.
$\frac{1}{4} + \frac{1}{4}$			
$\frac{3}{16} + \frac{3}{16}$			
$\frac{7}{8} - \frac{6}{8}$			
Write a rule:			
$\frac{1}{8} + \frac{1}{4}$			
$\frac{1}{2} + \frac{3}{4}$			
$\frac{3}{16} + \frac{1}{2}$			
Write a rule:			
$\frac{2}{3} * \frac{3}{4}$			
$\frac{5}{8} * \frac{2}{3}$			
$\frac{3}{8} * \frac{2}{9}$			
Write a rule:			
$4 \div \frac{1}{2}$			
$\frac{1}{2} \div 4$			
$\frac{2}{3} \div \frac{1}{5}$			
Write a rule:			

Adding Integers

While adding integers with the calculator, be certain to watch what happens to the positive and negative numbers. You will be writing some rules when you finish.

Problem	Calculator Answer
$12 + 5$	
$-12 + (-5)$	
$-15 + (-6)$	
$-7 + (-9)$	
Stop and write what you think.	
$7 + -7$	
$-12 + 12$	
Stop and write what you think.	
$15 + (-6)$	
$7 + (-9)$	
$4 + (-12)$	
Stop and write what you think.	

What have we learned from the calculator about adding integers?

- 1.
- 2.
- 3.
- 4.
- 5.

Subtracting with Integers

While subtracting integers with the calculator, be certain to watch what happens to the positive and negative numbers. You will be writing some rules when you finish.

Problem	Answers
$12 - 5$	
$15 - 6$	
$7 - 9$	
$4 - 12$	
Stop and write what you think.	
$-12 - 5$	
$-15 - 6$	
$-7 - 9$	
$-4 - 12$	
Stop and write what you think.	
$12 - (-5)$	
$15 - (-6)$	
$7 - (-9)$	
$4 - (-12)$	
Stop and write what you think .	
$-12 - (-5)$	
$-15 - (-6)$	
$-7 - (-9)$	
$-4 - (-12)$	
Write what you think .	

What do we learn from the calculator about subtracting integers?

- 1.
- 2.
- 3.
- 4.
- 5.

Multiplying and Dividing Integers

While multiplying and dividing integers with the calculator, be certain to watch what happens to the positive and negative numbers. You will be writing some rules when you finish.

Problem	Calculator Answer
$6 * 3$	
$- 8 * 3$	
$3 * (-7)$	
$- 4 * (- 6)$	
$(-2) * (-46)$	
$18 \div 3$	
$- 28 \div 3$	
$56 \div (- 7)$	
$- 48 \div (- 6)$	
$- 5 * (- 8)$	

What have we learned from the calculator about multiplying and dividing integers?

- 1.
- 2.
- 3.
- 4.

Integers and Fractions Practice 1

Name _____

I. Integers Simplify the following (add, subtract, multiply and divide)

1) $-13 + 19$ _____

11) $-18 / 3$ _____

2) $11 - (-5)$ _____

12) $-50 / -10$ _____

3) $-13 + (-6)$ _____

13) $(-8 + 12) (-3)$ _____

4) $-4 - (-9)$ _____

14) $(-4 - -20) (2)$ _____

5) $(8) (-4)$ _____

15) $-21 - (-20) - 18$ _____

6) $(-3) (-8)$ _____

16) $14 - 20 + 8 - (-5)$ _____

II. Fractions

1) $3/4 + 2/3$

4) $(2/3) (-27)$

2) $5/8 - 1/2$

5) $(-1/4) (-5/8)$

3) $6 \div 1/4$

6) $3/4(-1/2) - (-3/2) (1/4)$

Integers and Fractions Practice 2

Name _____

I. Integers Simplify the following (add, subtract, multiply and divide)

7) $-9 + 13$ _____

11) $-16 / 4$ _____

8) $18 - (-3)$ _____

12) $-55 / -11$ _____

9) $-14 + (-5)$ _____

13) $(-6 + 4) (-3)$ _____

10) $-3 - (-12)$ _____

14) $(-5 - -20) (3)$ _____

11) $(6) (-5)$ _____

15) $-15 - (-10) - 16$ _____

12) $(-4) (-7)$ _____

16) $11 - 13 + 8 - (-5)$ _____

II. Fractions

1) $3/8 + 1/6$

2) $1/4 - 2/3$

3) $7 \div 1/3$

4) $(3/4) (-24)$

5) $(-2/3) (-7/8)$

6) $3/4(-1/3) - (-5/6) (1/2)$

Integers and Fractions Review

Name _____

I. Integers Simplify the following (add, subtract, multiply and divide)

1) $-16 + 21$ _____

7) $-36 / 6$ _____

2) $8 - (-8)$ _____

8) $-49 / -7$ _____

3) $-22 + (-8)$ _____

9) $(-6 + 4)(-5)$ _____

4) $-10 - (-4)$ _____

10) $(-8 - -10)(5)$ _____

5) $(-7)(-6)$ _____

11) $-13 - (-10) - 18$ _____

6) $(-5)(9)$ _____

12) $17 - 21 + 7 - (-5)$ _____

II. Fractions

1) $1/4 + 2/5$

4) $(2/5)(-35)$

2) $7/8 - 3/4$

5) $(-2/5)(-5/6)$

3) $8 \div 1/3$

6) $3/4(-1/2) - (-1/2)(1/4)$