Connecting the Math Through Meaningful Tasks

NCTM 2015 Regional

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Outline of Workshop

1. Origami octagon pinwheel: http://www.origami-instructions.com/modular-origami-pinwheel.html

2. Connecting the Math

3. Show Me One Half

4. Random Numbers

    a. Fair Share of Cookies!

    b. Line It Up

    c. Go to Your Corner

5. Great Pizza Caper

A complete handout with investigations and materials used in the workshop are available through NCTM or the following website (or scan QR code): http://north-morris.net
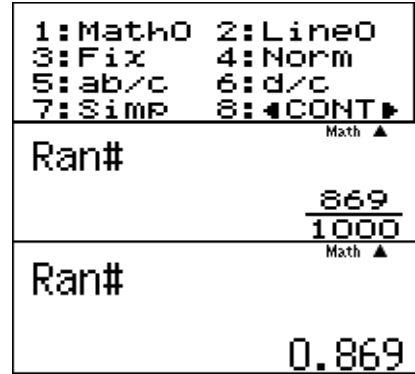
Random Fractions: I want at least ½!!! Please?

Let's set up your calculator to produce random fractions.

- Press [SETUP]
- Select [1](MathO)

- Press [Ran#] [=]

To change to decimal:
- Press [F↔D]

```
1:MathO 2:LineO
3:Fix    4:Norm
5:ab/c   6:d/c
7:Simp   8:◄CONT►
                    Math ▲
Ran#
                    869
                   1000
                    Math ▲
Ran#

                   0.869
```

With your partner, sort your fractions into the table:

NO!!!!	YES!!!!
Less than ½	At Least ½

Go to Your Corner!

Using your calculator to produce random numbers between 0 and 1000, let's set up your calculator.

Press [SETUP] and select [2] (Line0)

```
1:MathO 2:LineO
3:Fix    4:Norm
5:ab/c   6:d/c
7:Simp   8:◄CONT▶
```

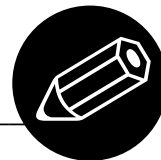Press [Ran#] [=]

```
                    Math ▲
Ran#

                    0.527
```

For this situation, we are going to ignore the decimal point and read the number as a 3-digit number. For example, the number above would be 527.

Your teacher has labeled each corner with the following numbers:
Corner A: 0 – 249; Corner B: 250 – 499; Corner C: 500 – 749; Corner D: 750 – 999

1. Guess how many of your classmates will end up in each corner when they create a random number.

   a. Corner A:

   b. Corner B:

   c. Corner C:

   d. Corner D:

2. Write a sentence about why you think there will be that many in each corner.

3. After the investigation, write a sentence about what you found out. Were your predictions correct?
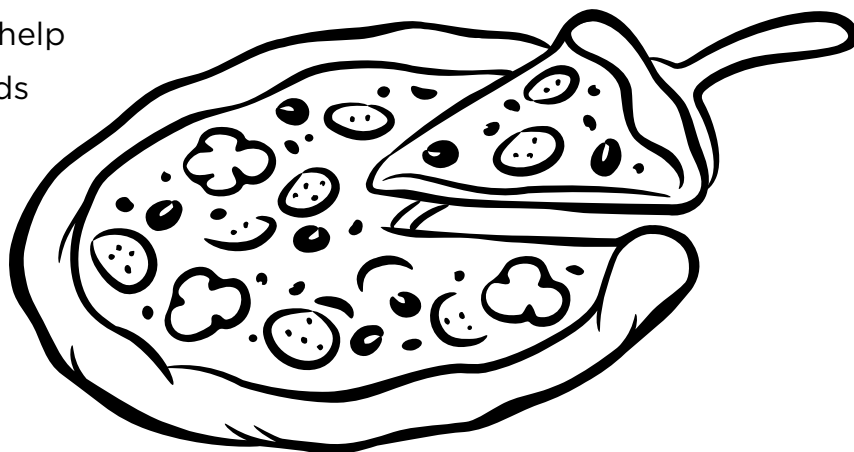
The Great Pizza Caper

Mixed Numbers and Improper Fractions

Max likes to invite some of his friends to share some pizzas equally. Every time he orders the pizza, someone in his family eats some of it before he can decide how many friends he can invite! Laurel says she can use mixed numbers and improper fractions to help Max quickly decide how many friends he can invite. Study each of the situations given below and show how Laurel helped Max.
(Hint: Use the 🔲 and 🔳 keys on your calculator!)

Situation 1
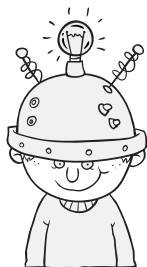
Max ordered 4 pizzas and his brother ate ⅔ of one of them. How many friends can Max invite to share the remaining pizza if each friend eats ⅓ of a pizza?

Situation 2

Max ordered 5 pizzas and his sisters ate $1\frac{1}{4}$ pizzas. How many friends can Max invite to share the remaining pizza if each friend eats ¼ of a pizza?

Situation 3

Max ordered 6 pizzas each cut into 16 pieces, and his cousins ate 10 pieces. How many friends can Max invite to share the remaining pizza if each friend eats ⅛ of a pizza?

Thinking Cap

What must be true about the number of pieces for each pizza that are cut into in Situation 1 and Situation 2? Explain your answers.

The Great Pizza Caper
Mixed Numbers and Improper Fractions

Instructional Strategies

Hands On:

Use fraction circles to demonstrate scenarios as an introduction to the activity. For example, give each group 2 pizzas (2 fraction circles). Tell them that their brother ate $\frac{1}{2}$ of one of the pizzas. Ask them how many friends can each have a $\frac{1}{2}$ pizza (in this case, there will be 3 halves left, so they can share with 3 friends). Try another example, using 6 pizzas and the brother eats $\frac{2}{3}$ of the pizza. How many friends can each have a $\frac{1}{3}$ pizza? As a challenge, give them an example like the 3rd scenario of the activity.

Getting Started:

Demonstrate how to use the calculator to recreate the situations explored in the Hands On section of the lesson.

Calculator Notes:

Students use the calculator in this activity first to subtract a fraction or a mixed number from a whole number. Then they use the calculator to change the mixed number answers to improper fractions to determine the number of friends Max can invite.

- The ▤ key can be used to enter fractions

- The ▣ key can be used to enter mixed numbers

    - The [ᵃᵇᵈᶜ] key can be used to toggle between mixed numbers and improper fractions (Note: this only works when Simplify mode is set to Auto — on the fx-55 Plus press [SETUP] [7] [1].)
    Example: For Situation 1, [4] [−] [2] [▤] [3] [=] $3\frac{1}{3}$. Press the [ᵃᵇᵈᶜ] key to change the mixed number to $\frac{10}{3}$. Since $10 \times \frac{1}{3} = \frac{10}{3}$, Max can invite 10 friends if he does not eat any.

Assessment:

Encourage students to work backward to check their answers. To check the example, use the [ᵃᵇᵈᶜ] key to change $\frac{10}{3}$ to a mixed number. Then add $\frac{2}{3}$. The answer should be 4.

Objective:
Use the calculator to solve problems that involve changing mixed numbers to improper fractions.

Common Core State Standards:
4.NF.3c – Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

Standards for Mathematical Practice:
1. Make sense of problems and persevere in solving them.
3. Construct viable arguments and critique the reasoning of others.