A crash course in fractions

Learning Targets

Day 1

I can draw models of fractions

I can identify the fraction unit

I can create equivalent fractions

I can simplify fractions

I can convert improper fractions to mixed numbers

I can convert mixed numbers to improper fractions

Step 1 - Know how to draw a model of a fraction

DI

Identify correct model

$$2\frac{1}{3}$$

1

2

3

DI

Naming fractions units

DI

Equivalent fractions

What are they?

How do you make them?

DI

Which fraction is equivalent to: $\frac{4}{6}$

$\frac{1}{3}$ $\frac{2}{3}$ $\frac{8}{9}$

DI

Equivalent fractions

$\frac{2}{\square} = \frac{8}{20}$ $\frac{5}{7} = \frac{15}{\square}$ $\frac{\square}{8} = \frac{4}{32}$ $\frac{4}{12} = \frac{12}{\square}$

$\frac{8}{10} = \frac{32}{\square}$ $\frac{3}{10} = \frac{12}{\square}$ $\frac{1}{\square} = \frac{2}{18}$ $\frac{\square}{4} = \frac{2}{8}$

$\frac{1}{\square} = \frac{4}{8}$ $\frac{4}{\square} = \frac{16}{24}$ $\frac{\square}{10} = \frac{20}{40}$ $\frac{5}{6} = \frac{20}{\square}$

DI

Fraction Concepts

Simplifying fractions by writing numerator and denominator as factors

15 and 25 have a common factor

$\frac{15}{25} = \frac{3 \times 5}{5 \times 5} = \frac{3}{5}$

You can "cancel" out the $\frac{5}{5}$

Reduce these (aka simplify)

$\frac{12}{21}$ $\frac{6}{54}$ $\frac{25}{75}$ $\frac{14}{35}$

next

DI

Practice Simplifying

1) $\frac{10}{80} =$ ___ 11) $\frac{10}{30} =$ ___ 21) $\frac{10}{40} =$ ___

2) $\frac{2}{16} =$ ___ 12) $\frac{12}{18} =$ ___ 22) $\frac{10}{14} =$ ___

10

Fraction Concepts

DI

Improper fractions to mixed numbers

Improper Fraction: Numerator is larger than denominator. A fraction greater than 1

$$\frac{12}{5} \qquad \frac{3}{2}$$

11

Fraction Concepts

DI

Improper fractions to mixed numbers

Mixed Number: Fractional number with whole number part and fractional part

$$3\frac{1}{2} \qquad 4\frac{2}{3}$$

12

DI

Writing a mixed number as an Improper fraction

Here you see how many wholes, how many fractional parts

$$3\frac{1}{2}$$

Improper fractions shows halves are in 3 and one half

13

DI

More on .... mixed to improper

$$3\frac{2}{5} = \frac{(5 \times 3) + 2}{5} = \frac{17}{5}$$

14

DI

Practice..... Mixed -> Improper

Write each mixed number as an improper fraction.

1. $6\frac{1}{3}$
2. $5\frac{3}{4}$
3. $7\frac{1}{6}$
4. $9\frac{1}{8}$
5. $2\frac{3}{16}$
6. $4\frac{5}{10}$
7. $4\frac{2}{3}$
8. $3\frac{1}{5}$

15

Converting Improper to Mixed

D1

Let's practice rewriting to show the wholes

$$\frac{8}{3} =$$

16

Fraction Concepts

D1

Improper fractions to mixed numbers

A Procedure.....

How do you convert improper to mixed?

Flip it on its side and divide

$$\frac{8}{3}$$

$$3\overline{)8}$$

17

Practice .... Improper to Mixed

D1

Write each improper fraction as a mixed number in simplest form.

1. $\frac{7}{5}$
2. $\frac{13}{8}$
3. $\frac{13}{4}$
4. $\frac{22}{7}$
5. $\frac{6}{4}$
6. $\frac{14}{8}$
7. $\frac{9}{6}$
8. $\frac{14}{10}$

18

DI

Problem Solving with Fractions

K-Mart had 90 umbrellas at the beginning of the day. If 3/5 of the umbrellas were sold during a particularly rainy day, how many umbrellas were left for sale after that day?

DI

Reducing Fractions with variables

.... but first a bit on exponents

What does this mean?

3^4

x^4

DI

Reducing Monomial Fractions

Write out as factors, then reduce

$$\frac{x^4}{x^3} \qquad \frac{12x^4}{3x^3}$$

More practice

$$\frac{12x^4\,y^3}{3x^3\,y^2}$$

One more

$$\frac{xy^3z2}{xyz}$$

Independent Practice

FCC DI

Learning Targets D2

Day 2

Review simplifying / reducing

I can solve contextual problems

I can draw models of multiplication of fractions

I can multiply with fractional numbers

Bell Work D2

Reduce by writing factors and canceling out common factors

19. $\frac{10x^8y^5}{4x^2y^5}$

20. $\frac{6x^5y^5}{12x^4y}$

21. $\frac{20x^3y^8}{30x^3y^7}$

22. $\frac{144x^5y^{18}}{12x^4y^2}$

Problem Solving with Fractions D2

UR Pets has both black and orange goldfish for sale. Of the 72 goldfish that they currently have, 3/8 are black. How many orange goldfish does UR Pets have for sale?

D2

Problem Solving with Fractions

Brian has 1755 hairs left on his head. Of these hairs, 2/9 have gone grey. How many non-grey hairs does Brian have on his head?

Problem Solving with Fractions

D2

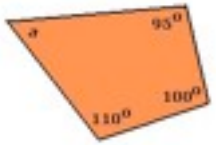
Lola has 42 pairs of shoes. If 3/7 of the shoes are high heels, how many of Lola's shoes are not high heels?

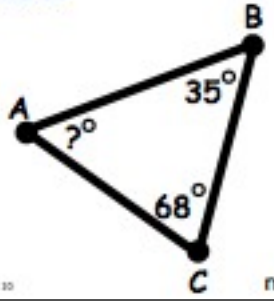
Concept Review

D2

What is the sum of the measures of the angles in a triangle?

What is the sum of the measures of the angles in a quadrilateral?

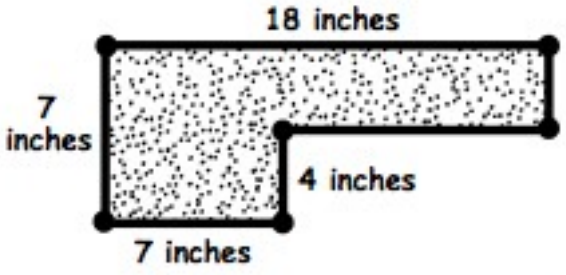




next

D2

How do you find the perimeter of a shape?



Next

D2

PEMDAS

Let a = 3, b = 0.3, c = 4

find

$a^3 \times b - c + 100b$

next

D2

Drawing models of fraction multiplication

Jim is planning his spring garden. He is going to use raised beds for planting. He will be buying bags if special organic planting mix at Zamsows.

1. How many bags will he need to buy for 3 beds if it takes 1 1/2 bags to fill each bed?

Draw a model

Write an expression

Draw a model of fraction multiplication

D2

$\frac{2}{3} \times 2 =$

$\frac{1}{2} \times 4 =$

Multiply a fraction by a whole number

D2

8) $\frac{1}{5} \times 5 =$

9) $\frac{1}{5} \times 3 =$

10) $\frac{1}{2} \times 4 =$

Fraction Concepts
Multiplying Fractions

D2

Multiplying Fractions .... Just multiply across the top and across the bottom

1. $\frac{1}{6} \times \frac{2}{3} =$

2. $\frac{4}{6} \times \frac{1}{8} =$

3. $\frac{4}{5} \times \frac{3}{5} =$

4. $\frac{2}{4} \times \frac{2}{4} =$

Which of these problems could be reduced BEFORE multiplying?

Fraction Concepts
Your Turn

D2

5. $\frac{3}{5} \times \frac{5}{6} =$

6. $\frac{1}{4} \times \frac{1}{3} =$

7. $\frac{5}{6} \times \frac{2}{4} =$

8. $\frac{5}{6} \times \frac{1}{3} =$

9. $\frac{2}{4} \times \frac{5}{6} =$

10. $\frac{3}{6} \times \frac{2}{3} =$

17

Fraction Concepts
Multiplying Fractions

D2

One tricky thing.... mixed numbers must be converted to improper fractions. AND you must reduce them!

$4\frac{1}{2} \times 3\frac{1}{5} =$

$3\frac{1}{4} \times 2\frac{1}{5} =$

18

Multiplying Mixed Numbers
You Try

D2

$4\frac{3}{4} \times 2\frac{1}{2} =$

$2\frac{9}{10} \times 4\frac{2}{3} =$

$2\frac{3}{5} \times 3\frac{1}{2} =$

$3\frac{1}{3} \times 3\frac{2}{5} =$

19

Independent Practice

D2

GM FCC 3072

40

Learning Targets

D3

Day 3

Review multiplying fractions

I can solve contextual problems

I can draw models of division of fractions

I can divide with fractional numbers

41

Bell Work

D3

Get out GM FCC ICP2 - the work we did yesterday. Make sure it is complete, circle any problems you want to discuss.

Let's Check .... GM FCC ICP2

Check answers... go over issues

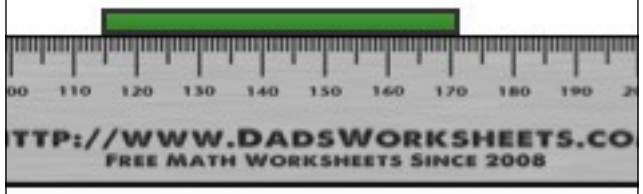
42

D3

Let's see how you are doing..... Complete on a separate piece of NBP

Left Side of Table	Right Side of Table
$3\frac{3}{4} \times 3\frac{3}{10} =$	$3\frac{1}{3} \times 4\frac{1}{2} =$
$4\frac{1}{2} \times 2\frac{2}{3} =$	$4\frac{4}{5} \times 2\frac{1}{2} =$
$3\frac{2}{3} \times 2\frac{1}{4} =$	$2\frac{4}{5} \times 2\frac{1}{2} =$

How long is the green bar? D3



Adding and Subtracting Integers D3

-3 + 6 =	-2 - 8 =
-3 - (-4) =	-2 + -8 =

PEMDAS

Let x = 4, y = 3, z = 5

find

$$2(x - y) - z + 3xy$$

Which fraction is equivalent to: $\frac{2}{6}$

$1\frac{1}{3}$ $\frac{1}{3}$ $\frac{3}{6}$

I ordered a pizza for dinner. Jason was very hungry and ate half of it. When Evan got home, he ate half of what was left. That last piece was for me....

How much of the pizza did I eat?

Problem Solving D3

I mowed the lawn for my mom and she paid me some money. Then I went to the store and spent some of it and I was left with $6. This was 2/3 of the amount of money that my mom paid me. How much money did my mom give me for mowing the lawn?

D3

Understanding Fractions

Ann spent 1/3 of her money and then lost 1/2 of what she had left. She then only had 30 dollars. How much money did Ann originally have?

Hint: Use a model to help you solve

Dividing with Fractions

Sam had 3 candy bars. He wanted to break each into halves. How many halves would he have?

Draw a model & write an expression.

Dividing Fractions D3

Jim is creating raised beds for his garden. He bought 6 bags of soil enricher. He wants to put one and one half bags in each bed. How many beds will he be able to add the soil enricher to?

Draw a model, write an equation.

Dividing Fractions D3

Draw a model

$$2\frac{3}{4} \div 2 =$$

Writing equivalent expressions D3

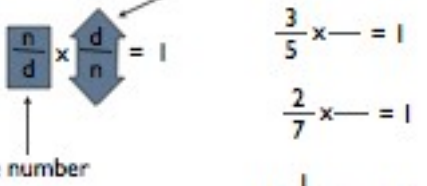
Are these the same?

$10 \div 2 = 5$ $10 \times 1/2 = 5$

We can always rewrite a division problem as a multiplication problem

Math Notes The reciprocal of a number D3

Definition: The product of a number and it's reciprocal is always 1.



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

$\frac{2}{7} \times \frac{\quad}{\quad} = 1$

$2\frac{1}{2} \times \frac{\quad}{\quad} = 1$

Math Notes

Traditional Algorithm - Dividing Fractions

1. Convert any mixed numbers to improper fractions..make whole numbers into fractions
2. Change to a equivalent expression where you multiply by the reciprocal of the dividend
3. Reduce first, then multiply numerators and then denominators
4. If improper, change to mixed

Let's try a few D3

$\frac{1}{4} \div 2 =$

$\frac{3}{5} \div \frac{1}{3} =$

$4 \div \frac{3}{4} =$

$\frac{1}{3} \div \frac{3}{4} =$

$3\frac{2}{4} \div \frac{1}{2} =$

$3\frac{2}{4} \div 2\frac{1}{5} =$

Practice dividing - use your notes if necessary

D3

$4 \div \frac{3}{4} =$

$\frac{1}{2} \div 3 =$

$3 \div \frac{1}{4} =$

$3 \div \frac{3}{5} =$

$1 \div \frac{1}{4} =$

$\frac{2}{4} \div 2 =$

$\frac{3}{6} \div \frac{3}{7} =$

$\frac{5}{8} \div \frac{2}{5} =$

$\frac{3}{4} \div \frac{2}{10} =$

$\frac{3}{6} \div \frac{2}{3} =$

$\frac{3}{4} \div 2\frac{1}{3} =$

$1\frac{2}{5} \div \frac{1}{4} =$

$3\frac{2}{3} \div 3\frac{1}{2} =$

18

Dividing Fractions

D3

Independent Practice

GM FCC ICP3

19

Learning Targets

D4

Day 4

Review dividing fractions

I can solve contextual problems

I can draw models of addition of fractions

I can add with fractional numbers

I can add monomials with fractional coefficients

20

Bell Work

D4

Get out GM FCC ICP3 - the work we did yesterday. Make sure it is complete, circle any problems you want to discuss.

GM FCC ICP3

Check answers... go over issues

41

D4

Let's see how you are doing..... Complete on a separate piece of NBP

Left Side of Table

$3\frac{2}{8} \div \frac{4}{7} =$

$\frac{2}{8} \div 4\frac{6}{9} =$

$1\frac{2}{6} \div 2\frac{5}{9} =$

Right Side of Table

$\frac{4}{5} \div 4\frac{5}{10} =$

$2\frac{5}{9} \div \frac{4}{5} =$

$1\frac{3}{4} \div 4\frac{7}{10} =$

42

Review Multiply Fractions

D4

$3\frac{2}{3} \times 1\frac{3}{5} =$

$2\frac{4}{5} \times 1\frac{2}{4} =$

$2\frac{1}{3} \times 2\frac{1}{2} =$

43

Review improper <-> mixed

Change to improper

5. $13\frac{1}{2}$ 6. $7\frac{3}{4}$

Change to mixed

1. $\frac{27}{8}$ 2. $\frac{13}{5}$

Problem Solving D4

A person on the moon weighs one-sixth of their weight on earth. If a person weighs 102 lbs on the earth, what would they weigh on the moon?

Problem Solving D4

A bike travels at 3/10 of the speed of a car that is traveling 60 miles an hour. How fast is the bike traveling?

PEMDAS

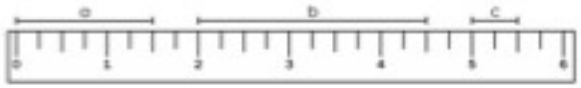
D4

Let x = 3, y = 4, z = 2

find

$$3(x^2 - y) - 2z$$

D4



#1 What is the distance of line segment **a**?

#2 What is the distance of line segment **b**?

Adding same size pieces

Discuss and pass to demonstrate why

Adding and Subtracting fractions with like denominators

What things do you need to keep in mind when you add and subtract fractions with **like denominators**. Make a list on your paper.

Add or subtract. Write in simplest form.

1. $\frac{3}{8} + \frac{3}{8}$
2. $\frac{7}{10} - \frac{5}{10}$
3. $\frac{9}{10} + \frac{3}{10}$
4. $\frac{4}{7} - \frac{2}{7}$
5. $\frac{2}{3} + \frac{2}{3}$
6. $\frac{5}{9} - \frac{2}{9}$

Next

Adding and Subtracting with Fractions with UNLIKE denominators

On your paper, explain why you can't add these fractions as they are. Then explain what needs to be done in order to add them.

$$\begin{array}{r} \frac{1}{3} \\ +\ \frac{1}{6} \\ \hline \end{array} \qquad \begin{array}{r} \frac{1}{2} \\ +\ \frac{3}{4} \\ \hline \end{array}$$

Adding Fractions

D4

$$\begin{array}{r} \frac{1}{3} \\ +\ \frac{1}{6} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{1}{2} \\ +\ \frac{3}{4} \\ \hline \end{array}$$

Addition of Fractions D4

$$\frac{13}{16}+\frac{1}{8}$$

$$\frac{5}{12}+\frac{1}{4}$$

$$\frac{4}{15}+\frac{3}{5}$$

Addition of Fractions D4

$5\frac{2}{4} + 7\frac{7}{10} =$

$3\frac{3}{4}+8\frac{3}{8}$

Try a few more D4

$2\frac{1}{2} + 6\frac{4}{5} =$

$3\frac{1}{3} + 5\frac{1}{2} =$

Adding fractions with a bit of algebra

D4

$$\frac{x}{3} + \frac{x}{2}$$

$$\frac{4t}{5} + \frac{t}{2}$$

Adding Fractions

D4

Independent Practice

GM FCC ICP4

Learning Targets

Day 5

D5

Demonstrate with Summative Assessment:

I can multiply, divide and add fractions

I can solve contextual problems

Bell Work

D5

Get out GM FCC ICP4 - the work we did yesterday. Make sure it is complete, circle any problems you want to discuss.

GM FCC ICP4

Check answers... go over issues

Problem Solving

D5

If 5/12 of a number is 65, what is ¾ of the number?

Change to Improper Fractions

D5

1. $5\frac{7}{8}$ 2. $9\frac{2}{3}$ 3. $2\frac{1}{2}$ 4. $1\frac{1}{8}$

D5

Change to mixed numbers

1. $\frac{65}{10}$ = 2. $\frac{40}{6}$ = 3. $\frac{22}{4}$ =

D5

Review Adding fractions

$\frac{3}{26} + \frac{3}{13} =$ $1\frac{1}{2} + 2\frac{1}{3} =$

$\frac{2}{4} + \frac{3}{6} =$

D5

Review Multiplication of Fractions

$\frac{6}{9} \times \frac{1}{3} =$

$2\frac{4}{5} \times 5 =$

$4\frac{1}{3} \times 1\frac{7}{8} =$

Review Dividing Fractions

D5

4. $\frac{3}{4} \div 2\frac{1}{3} =$

5. $6\frac{4}{5} \div \frac{1}{2} =$

6. $8\frac{1}{3} \div \frac{5}{6} =$

Fraction Quiz

D5

Summative Assessment

GM FCC Quiz 1

Learning Targets

Day 6

D6

I can subtract fractions, regrouping when necessary

I can solve contextual problems

Computational Warmup

3

$8\frac{2}{11} + 6\frac{1}{2} =$

$3\frac{1}{3} \times 2\frac{1}{2}$

$14\frac{3}{7}$
$-\ 10\frac{1}{2}$

$7\frac{1}{2} \div 2\frac{5}{6} = w$

Problem Solving

D6

Draw a model, write an equation and solve

Belinda baked 9 pies that weigh $20\frac{1}{4}$ pounds total. How much does each pie weigh?

Problem Solving

D6

Tanya has read $\frac{3}{4}$ of a book, which is 390 pages. How many pages are in the entire book?

Problem Solving D6

When I was gardening, found a half of a bag of soil additive. I used the one-third of this bag for a big pot I was filling with flowers. If the original bag held 30 lbs, How much soil additive did I put in the big pot? (What fraction of the original bag I used, and how many pounds did I use.)

Solve by drawing a model of and stating the result: D6

2 x 3/5

3 ÷ 3/4

1/3 + 3/4

Subtracting with Un-like Denominators D6

1) $\frac{2}{4} - \frac{1}{3} =$

2) $\frac{2}{4} - \frac{1}{3} =$

3) $\frac{2}{3} - \frac{1}{2} =$

more .... Subtracting D6

$11\frac{3}{5} - 5 =$

$1\frac{11}{12} - \frac{2}{3} =$

$14\frac{1}{2} - 2\frac{1}{8} =$

Subtracting with regrouping D6

$6 - 4\frac{7}{8} =$

$4\frac{4}{7} - 3\frac{6}{7} =$

$5\frac{1}{6} - 2\frac{1}{3} =$

Subtracting with regrouping D6

1) $6\frac{2}{3} - 3\frac{1}{2} =$

2) $7\frac{3}{4} - 4\frac{2}{10} =$

4) $2\frac{4}{10} - 7\frac{2}{3} =$

5) $1\frac{1}{2} - 8\frac{4}{5} =$

D6

A little algebra…

Subtract

$$\frac{x}{6} - \frac{x}{12}$$

$$\frac{2y}{3} - \frac{y}{4}$$

D6

Independent

Practice

D7

Problem solving involving fractions

Practice reducing Fractions

Review add, subtract, multiply, divide with fractions

Drawing models of add, subtract, multiply, divid

Solve contextual problems by modeling

Computational Warmup

D7

$9\frac{5}{9} + 10\frac{5}{12} =$

$\frac{6}{7} \times \frac{8}{15}$

$\frac{9}{10} - \frac{2}{5}$

$3\frac{1}{3} \div \frac{2}{9}$

Computational Warmup

D7

$$\begin{array}{r} 11 \\ +\ 3\frac{5}{9} \\ \hline \end{array}$$

$4\frac{1}{5} \times \frac{1}{7}$

$$\begin{array}{r} 15\frac{1}{4} \\ -\ 5\frac{1}{2} \\ \hline \end{array}$$

$\frac{5}{8} \div 2\frac{1}{2}$

Reducing Fractions

10) $\frac{23}{5} =$

11) $\frac{18}{3} =$

13) $\frac{37}{9} =$

14) $\frac{28}{8} =$

Subtracting Fractions...When do you need to regroup?

7) $5\frac{1}{6} - 2\frac{1}{3} =$

8) $14\frac{1}{2} - 2\frac{1}{8} =$

Draw a model and solve

Belinda baked 9 pies that weigh $20\frac{1}{4}$ pounds total. How much does each pie weigh?

Problem Solving

Draw a model and solve.
Write an equation and solve.

Lola has 42 pairs of shoes. If 3/7 of the shoes are high heels, how many of Lola's shoes are not high heels?

Problem Solving D7

Draw a model AND Write an equation and solve

For a party I was throwing, I had baked 10 cakes. My husband came home and ate 1/3 of one of them. If I wanted to serve the remainder of the cakes to my guests, how many servings of cake can I serve if each person will get 1/5 of a cake.

Bonus question: Any left over cake is mine... what is the size of the piece of cake I'll have?

106

Problem Solving D7

K-Mart had 200 umbrellas at the beginning of a "rainy day sale". One customer came in and purchased 1/10 of the umbrellas. If 3/9 of the remaining umbrellas did not get sold during the sale, how many umbrellas did K-Mart sell during the sale?

107

Problem Solving D7

Jack barked at 16 cats last night. If this was 2/5 of all the times Spot barked last night, how many times did he bark at things that were **not** cats?

108

D7

Independent Practice

FCC ICP D7

109

Practice for FCC Unit Test

D8

Tomorrow you will have FCC Unit test

Improper <-> mixed
Reducing
Add, sub, mult, divide
Subtract with regrouping two ways
Modeling contextual problems
Explaining why you need common denominators when adding and subtracting, and why you don't when mult and divide
draw models of adding two fractions
draw models of multiplying fractions
draw models of dividing fraction

110

Computational Warmup

D8

$1\frac{2}{3}+\frac{3}{7}=$

$1\frac{1}{7}\times 9\frac{1}{3}=$

$4\frac{4}{7}-3\frac{6}{7}=$

$6\frac{4}{5}\div\frac{1}{2}=$

111

Solve

DB

$$4\frac{1}{2} \times \frac{5}{3} \times 1\frac{3}{10}$$

$$7\frac{1}{3} \times \frac{3}{8} \times \frac{5}{6}$$

Adding and Subtracting review

DB

$$14 - 2\frac{1}{9} =$$

$$14\frac{1}{2} - 2\frac{1}{8} =$$

Model and then solve

DB

$$5\frac{1}{2} + p = 6$$

DB

Model then solve

$$x - \frac{1}{2} = 1\frac{1}{4}$$

DB

Draw a model of and explain:

$\frac{1}{2} \div \frac{3}{4} =$

$\frac{9}{10} \div \frac{1}{2} =$

$6 \times \frac{1}{3} =$

$\frac{6}{9} \times \frac{1}{3} =$

DB

Draw a model of and explain:

$$\frac{8}{9} - \frac{2}{3} =$$

$$8\frac{4}{5} + 8\frac{1}{10} =$$

DB

Draw a model of and explain:

$$\frac{2}{3} + \frac{1}{2} =$$

$$\frac{1}{2} - \frac{1}{3} =$$

DB

Draw a model, write an equation and solve

$3\frac{1}{3}$ feet are cut off a board that is $12\frac{1}{4}$ feet long. How long is the remaining part of the board?

Independent Practice

FCC Unit Test practice