Lesson 9:

Add and subtract fractions with unrelated units by finding equivalent fractions numerically.

CCSS Standard – 5.NF.A.1

FLUENCY (10-min)

Whiteboard Exchange:
Multiply Multi-digit Whole Numbers

Write and complete the equation using the STANDARD ALGORITHUM

$$1{,}307 \times 5 = \_\_\_\_\_$$

FLUENCY (10-min)

Whiteboard Exchange:
Multiply Multi-digit Whole Numbers

Write and complete the equation using the STANDARD ALGORITHUM

$$5{,}009 \times 6 = \underline{\qquad\qquad}$$

FLUENCY (10-min)

Whiteboard Exchange:
Multiply Multi-digit Whole Numbers

Write and complete the equation using the STANDARD ALGORITHUM

$$3{,}060 \times 8 = \_\_\_\_\_$$

FLUENCY (10-min) **Whiteboard Exchange: Equivalent Fractions**

Write and complete the equation to find a fraction equivalent to 2/3

$$\frac{2}{3} = \frac{2 \times \square}{3 \times \square} = \frac{\square}{6}$$

FLUENCY (10-min) **Whiteboard Exchange: Equivalent Fractions**

Write and complete the equation to find an equivalent fraction.

$$\frac{2}{5} = \frac{2 \times \square}{5 \times \square} = \frac{\square}{10}$$

$$\frac{3}{4} = \frac{3 \times \square}{4 \times \square} = \frac{\square}{12}$$

$$\frac{4}{5} = \frac{4 \times \square}{5 \times \square} = \frac{8}{\square}$$

$$\frac{5}{6} = \frac{5 \times \square}{6 \times \square} = \frac{10}{\square}$$

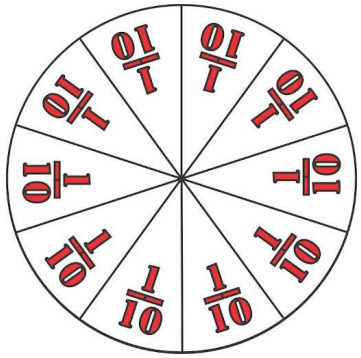
LAUNCH (5-min)

About 3,400 years ago in Egypt, a scribe named Ahmes wrote math problems on papyrus. Ahmes often recorded problems that occurred in daily life. One such example is how to split 9 loaves of bread equally among 10 people.

TURN & TALK: How might they split 9 loaves of bread equally among 10 people?

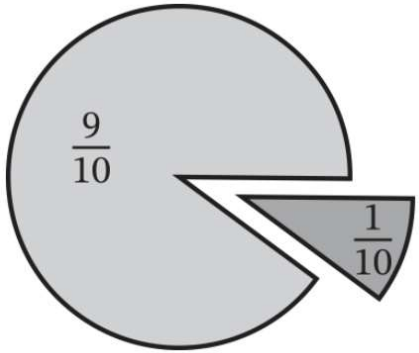
One way…

Split each loaf of bread into 10 equal parts, making a total of 90 pieces of bread. Each person would receive 9 small pieces of bread.



Another way…

Cut 1/10 from each loaf. Then 9 of the people would receive 9/10 of a loaf, and 1 person would get all 9 of the 1/10 pieces that were cut from each loaf?



Do all the people receive the same amount of bread both ways?

Ahmes came up with a solution that he thought was a better way of sharing the bread equally. Each person received…..

$$\frac{2}{3} + \frac{1}{5} + \frac{1}{30}$$

What do you notice? Wonder?
We will come back to his solution later in the lesson.

LEARN (35-min) **Add and Subtract Unrelated Fractions**

LEARN BOOK PAGE 77

$$\frac{1}{4} + \frac{1}{6} = \_\_\_\_\_$$

Are the units in this problem related or unrelated? How do you know?

The units are UNRELATED. 6 is not a multiple of 4 and 4 is not a factor of 6.

Do we need to RENAME one fraction or both?

We need to RENAME both fractions.

Today we will not be drawing area models but rather finding COMMON DENOMINATORS to rename these fractions.

Let's begin by looking at the denominators and skip-counting by multiples of 4 and 6 until we see some COMMON numbers.

4: 4, 8, 12, 16, 20…

6: 6, 12, 18, 24, 30…

Which multiple is COMMON?

12

We found that a COMMON multiple of 4 and 6 is 12. So, we can RENAME BOTH fractions as twelfths.

$$\frac{1}{4} = \frac{1 \times 3}{4 \times 3} = \frac{3}{12} \qquad \frac{1}{6} = \frac{1 \times 2}{6 \times 2} = \frac{2}{12}$$

$$\frac{3}{12} + \frac{2}{12} = \frac{5}{12}$$

LEARN (35-min) **Add and Subtract Unrelated Fractions**

LEARN BOOK PAGE 77

$$\frac{8}{9} + \frac{7}{6} = \_\_\_\_\_$$

Are the units in this problem related or unrelated? How do you know?

The units are UNRELATED. 9 is not a multiple of 6 and 6 is not a factor of 9.

Do we need to RENAME one fraction or both?

We need to RENAME both fractions.

Today we will not be drawing area models but rather finding COMMON DENOMINATORS to rename these fractions.

Let's begin by looking at the denominators and skip-counting by multiples of 9 and 6 until we see some COMMON numbers.

9: 9, 18, 27, 36, 45…

6: 6, 12, 18, 24, 30…

Which multiple is COMMON?

18

We found that a COMMON multiple of 9 and 6 is 18. So, we can RENAME BOTH fractions as eighteenths.

$$\frac{8}{9} = \frac{8 \times 2}{9 \times 2} = \frac{16}{18} \qquad \frac{7}{6} = \frac{7 \times 3}{6 \times 3} = \frac{21}{18}$$

$$\frac{16}{18} + \frac{21}{18} = \frac{37}{18}$$

LEARN (35-min) **Add and Subtract Unrelated Fractions**

LEARN BOOK PAGE 77

$$\frac{4}{5} - \frac{2}{7} = \_\_\_\_\_$$

Are the units in this problem related or unrelated? How do you know?

The units are UNRELATED. 5 is not a multiple of 7 and 7 is not a factor of 5.

Do we need to RENAME one fraction or both?

We need to RENAME both fractions.

Today we will not be drawing area models but rather finding COMMON DENOMINATORS to rename these fractions.

Let's begin by looking at the denominators and skip-counting by multiples of 5 and 7 until we see some COMMON numbers.

5: 5, 10, 15, 20, 25, 30, 35…

7: 7, 14, 21, 28, 35…

Which multiple is COMMON?

35

We found that a COMMON multiple of 9 and 6 is 18. So, we can RENAME BOTH fractions as eighteenths.

$$\frac{4}{5} = \frac{4 \times 7}{5 \times 7} = \frac{28}{35} \qquad \frac{2}{7} = \frac{2 \times 5}{7 \times 5} = \frac{10}{35}$$

$$\frac{28}{35} - \frac{10}{35} = \frac{18}{35}$$

LEARN (35-min) **Add and Subtract Unrelated Fractions**

LEARN BOOK PAGE 78

$$\frac{5}{20} + \frac{3}{12} + \frac{3}{4} = \_\_\_\_\_$$

20: 20, 40, 60…

12: 12, 24, 36, 48, 60…

4: 4, 8, 12, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60…

$\frac{5}{20} = \frac{5 \times 3}{20 \times 3} = \frac{15}{60}$ $\frac{3}{12} = \frac{3 \times 5}{12 \times 5} = \frac{15}{60}$

$\frac{3}{4} = \frac{3 \times 15}{4 \times 15} = \frac{45}{60}$ $\frac{15}{60} + \frac{15}{60} + \frac{45}{60} = \frac{75}{60}$

$\frac{5}{20} = \frac{5 \div 5}{20 \div 5} = \frac{1}{4}$

$\frac{3}{12} = \frac{3 \div 3}{12 \div 3} = \frac{1}{4}$

$\frac{1}{4} + \frac{1}{4} + \frac{3}{4} = \frac{5}{4}$

LEARN (35-min) **Add and Subtract Unrelated Fractions**

LEARN BOOK PAGE 78

$$\frac{2}{3}+\frac{1}{5}+\frac{1}{30}=\_\_\_\_\_$$

30: 30…

5: 5, 10, 15, 20, 25, 30…

3: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30…

$\frac{1}{30}=\frac{1\times1}{30\times1}=\frac{1}{30}$ $\frac{1}{5}=\frac{1\times6}{5\times6}=\frac{6}{30}$

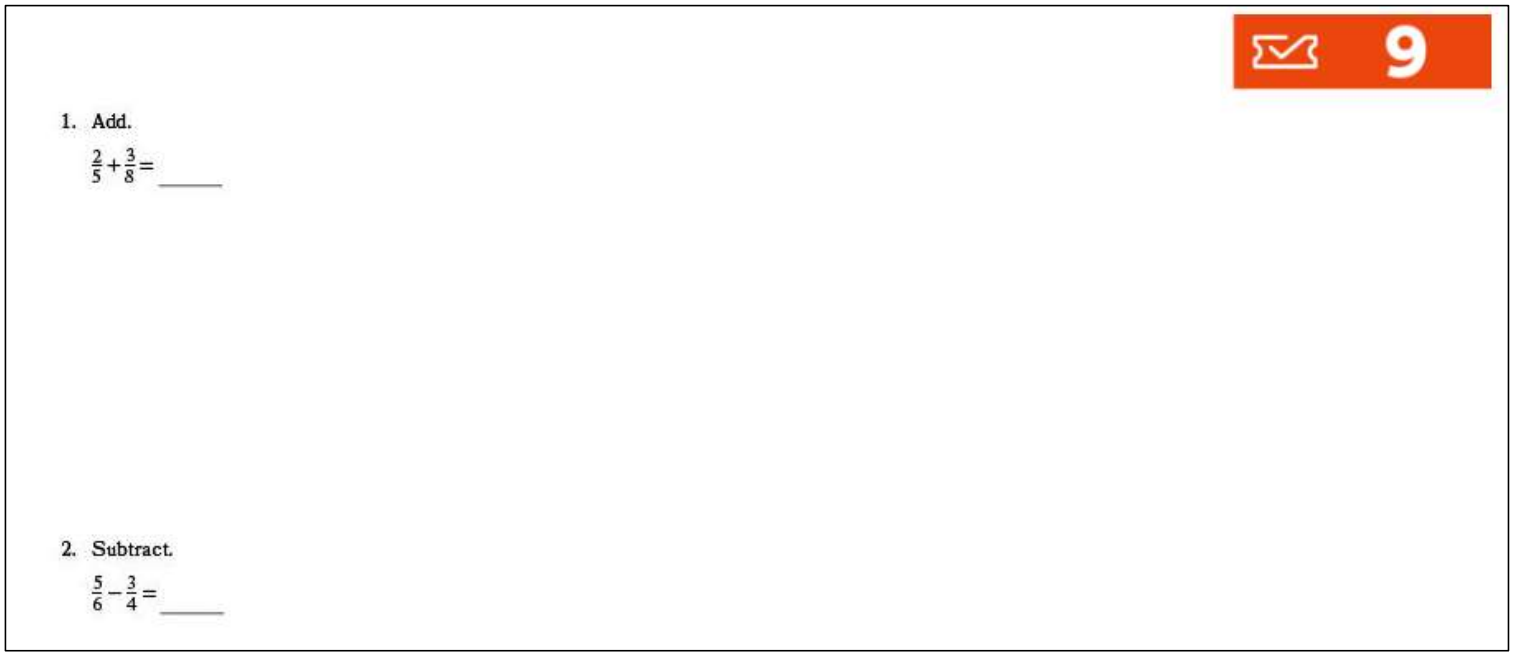
$\frac{2}{3}=\frac{2\times10}{3\times10}=\frac{20}{30}$ $\frac{1}{30}+\frac{6}{30}+\frac{20}{30}=\frac{27}{30}$

If you remember from earlier in the lesson Ahmes used this expression to solve for **9 loaves of bread divide by 10 people.**
Does it work?

$\frac{27}{30}=\frac{27\div3}{30\div3}=\frac{9}{10}$

LAND (10-min)

Exit Ticket



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Small Group Time:
Problem Set Page 79 & 80

Homework:
Page 61 APPLY BOOK