Lesson 15

Understand
Fraction Addition and Subtraction

Name: _____

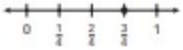
Prerequisite: How do you show fractions with number lines and area models?

Study the example problem showing fractions with number lines and area models. Then solve problems 1–7.

Example

How can you draw two different models to show $\frac{3}{4}$?

An area model for $\frac{3}{4}$ shows 4 equal parts, and 3 parts shaded.



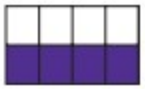
A number line model for $\frac{3}{4}$ shows each whole cut into 4 equal parts. $\frac{3}{4}$ is the mark at the end of the third part.

M 1 Label the numbers 1, $\frac{3}{8}$, and $\frac{4}{8}$ on the number line.

B 2 Shade the area model to show $\frac{3}{8}$.

Answers will vary.
Any 3 sections may be shaded.

B 3 Shade the area model to show $\frac{4}{8}$.



Answers will vary.
Any 4 sections may be shaded.

Solve.

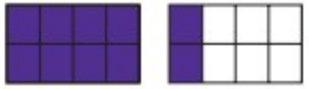
M 4 Show the numbers $\frac{8}{8}$ and $\frac{10}{8}$ on the number line.

B 5 Shade the area model to show $\frac{8}{8}$.

C 6 Why can't you show $\frac{10}{8}$ on the area model above?

Answers will vary. Possible answer: $\frac{10}{8}$ is more than one whole, but there is only one whole shown. I would need to shade part of another whole also to show $\frac{10}{8}$.

C 7 Shade the area models below to show $\frac{10}{8}$.



Answers will vary.
Any 10 sections may be shaded.

Key		
B Basic	**M** Medium	**C** Challenge

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Show Adding and Subtracting Fractions

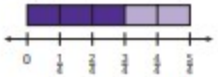
Study how the example shows adding fractions.
Then solve problems 1–12.

Example

You can count on or count back to add or subtract whole numbers.
You can do the same to add or subtract fractions.

To add fourths, use a number line that shows fourths.

Add $\frac{3}{4} + \frac{2}{4}$.



Start at $\frac{3}{4}$. One more fourth is $\frac{4}{4}$, and another fourth is $\frac{5}{4}$.

$\frac{3}{4} + \frac{2}{4} = \frac{5}{4}$

B 1 Count by sixths to fill in the blanks:

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

B 2 Now label the number line to show sixths.

M 3 What is $\frac{1}{6}$ more than $\frac{2}{6}$? $\frac{3}{6}$

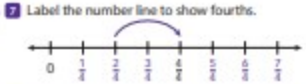
M 4 What is $\frac{1}{6}$ less than $\frac{2}{6}$? $\frac{1}{6}$

M 5 What is $\frac{1}{6}$ more than $\frac{6}{6}$? $\frac{7}{6}$

M 6 What is $\frac{1}{6}$ less than $\frac{6}{6}$? $\frac{5}{6}$

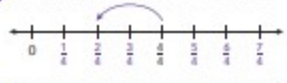
Solve.

B 7 Label the number line to show fourths.



M 8 Now use the number line in problem 7 to show $\frac{2}{4} + \frac{2}{4}$.

B 9 Label the number line to show fourths again.

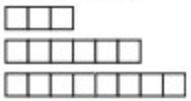


M 10 Now use the number line in problem 9 to show $\frac{4}{4} - \frac{2}{4}$.

M 11 Use the number line and area model below to show $\frac{2}{8} + \frac{1}{8} + \frac{3}{8}$.

Shading will vary.
Any 6 sections may be shaded.

C 12 Look at the three area models. Which one would you choose to show $\frac{1}{8} + \frac{2}{8}$? Explain how the denominator of the fraction helps you choose the model.



Answers will vary. Possible answer: I would choose the one with 8 parts. I need that one because the denominator of both fractions is 8 so I need to have 8 equal parts.

Vocabulary

denominator the number below the line in a fraction. It tells how many equal parts are in the whole.

$\frac{3}{4}$ → 4 equal parts

numerator the number above the line in a fraction. It tells how many equal parts are described.

$\frac{3}{4}$ → 3 parts described

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Reason and Write

Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.

Answers will vary. Note whether students incorporate the features they chose in their answer on the next page.

Example

Rob drew this diagram to show $\frac{1}{10} + \frac{3}{10} + \frac{4}{10}$

Rob says that his picture shows that $\frac{1}{10} + \frac{3}{10} + \frac{4}{10} = \frac{10}{10}$ or 1 whole.

What did Rob do right? What did he do wrong?

Show your work. Use pictures, words, or numbers to explain your answer.

Rob drew the number line the right way. He marked it to show tenths because the fractions in the problem are in tenths. He also showed that $\frac{10}{10}$ is one whole.

He shaded 1 tenth and 3 tenths and 4 tenths because the numbers in the problem are $\frac{1}{10}$ and $\frac{3}{10}$ and $\frac{4}{10}$.

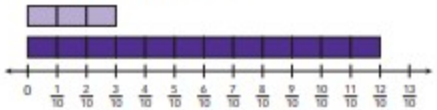
His mistake was leaving spaces between the shaded parts. When you count up on a number line, you can't skip numbers. He should have drawn this.

Then he would see that $\frac{1}{10} + \frac{3}{10} + \frac{4}{10} = \frac{8}{10}$.

Where does the example . . .
- answer both parts of the question?
- use a picture to explain?
- use numbers to explain?
- use words to explain?
- give details?

Solve the problem. Use what you learned from the example.

Paul drew this diagram to show $\frac{12}{10} - \frac{3}{10}$.



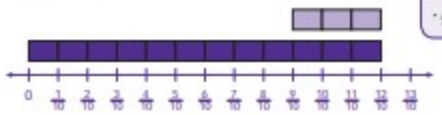
Paul says that his picture shows that $\frac{12}{10} - \frac{3}{10} = \frac{3}{10}$.

What did Paul do right? What did he do wrong?

Show your work. Use pictures, words, or numbers to explain your answer.

Did you . . .
- answer both parts of the question?
- use a picture to explain?
- use numbers to explain?
- use words to explain?
- give details?

Answers will vary. Possible explanation:
Paul drew a bar for 3 tenths. But then instead of finding the difference, he just wrote $\frac{3}{10}$ for his answer.
One way he could show the difference is to show taking away 3 tenths from 12 tenths.



This shows that if you count back 3 tenths from 12 tenths you end up at 9 tenths.

So, $\frac{12}{10} - \frac{3}{10}$ is $\frac{9}{10}$.

Multi-Digit Multiplication—Skills Practice

Name: _____

Multiply 2-digit numbers. **Form A**

1	2	3	4	5
21 × 35 = 735	18 × 16 = 288	24 × 12 = 288	32 × 15 = 480	12 × 37 = 444
6	7	8	9	10
11 × 77 = 847	54 × 92 = 4,968	64 × 35 = 2,240	75 × 28 = 2,100	43 × 15 = 645
11	12	13	14	15
42 × 96 = 4,032	40 × 88 = 3,520	57 × 64 = 3,648	96 × 70 = 6,720	61 × 54 = 3,294
16	17	18	19	20
82 × 27 = 2,214	26 × 45 = 1,170	82 × 34 = 2,788	63 × 36 = 2,268	35 × 27 = 945
21	22	23	24	25
20 × 16 = 320	41 × 30 = 1,230	98 × 20 = 1,960	36 × 79 = 2,844	28 × 49 = 1,372