Lesson 12 | The Least Common Multiple

Problem Solving:
Reading Line Graphs

The Least Common Multiple

Vocabulary
least common multiple

Why is the least common multiple important?

When we add and subtract fractions, it makes sense to keep the denominators as small as possible. Fractions with small denominators are easy to work with.

Look at this problem:

$\frac{5}{6} - \frac{7}{9}$

If we count by 6s and 9s in our head, we might think of 54:
$6 \cdot 9 = 54$.

So we know 54 is a common multiple of 6 and 9.

Let's create common denominators using 54 and solve the problem in two steps.

Subtract $\frac{5}{6} - \frac{7}{9}$.

Steps for Making Common Denominators to Subtract Fractions

STEP 1
Find common denominators.

Multiply each fraction by a fraction equal to 1 to make both denominators 54.

$\frac{5}{6} \cdot \frac{9}{9} = \frac{45}{54}$

$\frac{7}{9} \cdot \frac{6}{6} = \frac{42}{54}$

STEP 2
Solve the problem.

$\frac{45}{54} - \frac{42}{54} = \frac{3}{54}$

The answer is a large fraction. Large fractions can be hard to understand. We can use fractions that are easier to understand if we find the **least common multiple** for 6 and 9. The least common multiple is the smallest common multiple of two or more numbers.

How do we find the least common multiple?

Example 1

Find the least common multiple for 6 and 9 using a number line and multiple counting. Then subtract $\frac{5}{6} - \frac{7}{9}$.

Use a Number Line

Multiples of 6:

Multiples of 9:

The least common multiple of 6 and 9 is 18.

Count by Multiples

6s	6	12	**18**	24	30	**36**	42	48	**54**
9s	9	**18**	27	**36**	45	**54**			

The least common multiple of 6 and 9 is 18.

Now let's solve the problem. $\frac{5}{6} - \frac{7}{9}$.

STEP 1

Find the common denominators.

We know that 18 is the least common multiple. So we need to multiply each fraction by a fraction equal to 1 to make both denominators 18.

$$\frac{5}{6} \cdot \frac{3}{3} = \frac{15}{18}$$

$$\frac{7}{9} \cdot \frac{2}{2} = \frac{14}{18}$$

Finding the least common multiple makes it easier to work with fractions.

STEP 2

Solve the problem.

$$\frac{15}{18} - \frac{14}{18} = \frac{1}{18}$$

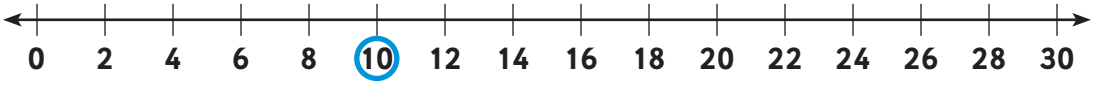
Our answer is $\frac{1}{18}$.

Example 2

Find the least common multiple for 2 and 5 using a number line and multiple counting. Then add $\frac{1}{2} + \frac{2}{5}$.

Use a Number Line

Multiples of 2:



Multiples of 5:

The least common multiple of 2 and 5 is 10.

Count by Multiples

2s	2	4	6	8	**10**	12	14	16	18	**20**	22	24	26	28	**30**
5s	5	**10**	15	**20**	25	**30**	35	40	45	50					

The least common multiple of 2 and 5 is 10.

Now let's solve the problem: $\frac{1}{2} + \frac{2}{5}$.

STEP 1

Find the least common denominators.

We know that 10 is the least common multiple.

$$\frac{1}{2} \cdot \frac{5}{5} = \frac{5}{10}$$

$$\frac{2}{5} \cdot \frac{2}{2} = \frac{4}{10}$$

STEP 2

Solve the problem.

$$\frac{5}{10} + \frac{4}{10} = \frac{9}{10}$$

Our answer is $\frac{9}{10}$.

We use the least common multiplier to find the smallest common denominator of two or more fractions.

Apply Skills
Turn to ***Interactive Text***, page 33.

mBook Reinforce Understanding
Use the ***mBook Study Guide*** to review lesson concepts.

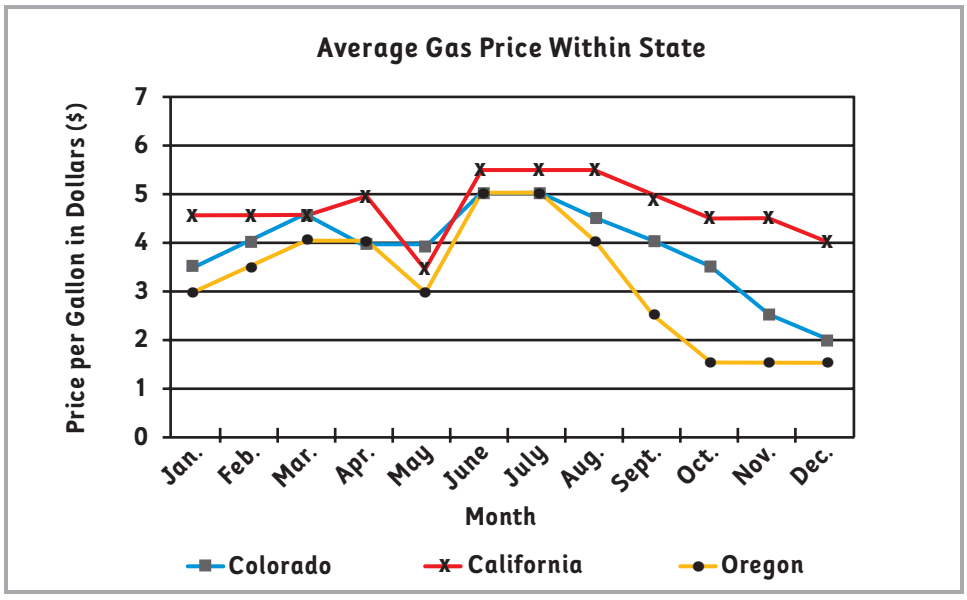
Problem Solving: Reading Line Graphs

How do we read trends on a line graph?

Line graphs are often used to show change over time. They can show whether a good or service is going up in price over time, or going down. We can find trends in fashion, the financial market, and the housing industry, for example.

The following graph shows the trend in gas prices for three states—California, Colorado, and Oregon—over 12 months. We see that prices go up in all three states during the summer months. The graph also shows that prices are highest in California.

There can be many reasons for a change in the trend. Circumstances such as weather, the availability of gas, and the time of year can have an effect on the trend.



Problem-Solving Activity
Turn to ***Interactive Text***, page 34.

mBook Reinforce Understanding
Use the ***mBook Study Guide*** to review lesson concepts.

Homework

Activity 1

Solve the addition and subtraction problems by creating common denominators.

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

Activity 2

Solve the addition and subtraction problems by finding the common denominator. You will have to convert both fractions.

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

Activity 3 • Distributed Practice

Solve.

1. $\begin{array}{r} 7{,}012 \\ -\ 1{,}987 \\ \hline \end{array}$
2. $\begin{array}{r} 800 \\ +\ 900 \\ \hline \end{array}$
3. $\begin{array}{r} 40 \\ \times\ 30 \\ \hline \end{array}$
4. $\begin{array}{r} 617 \\ \times\ \ 8 \\ \hline \end{array}$
5. $7\overline{)428}$