

Least Common Denominator

You can find and use the least common denominator (LCD) to add mixed numbers.



Example

Find $2\frac{1}{3} + 1\frac{5}{12}$.

Estimate. $2\frac{1}{2} + 1\frac{1}{2} = 4$

STEP 1

Find the LCD. Write equivalent fractions.

$$\begin{array}{r} 2\frac{1}{3} = 2\frac{4}{12} \\ + 1\frac{5}{12} = + 1\frac{5}{12} \\ \hline \end{array}$$

STEP 2

Add the fractions.

$$\begin{array}{r} 2\frac{1}{3} = 2\frac{4}{12} \\ + 1\frac{5}{12} = + 1\frac{5}{12} \\ \hline \frac{9}{12} \end{array}$$

STEP 3

Add the whole numbers. Write the answer in simplest form if needed.

$$\begin{array}{r} 2\frac{1}{3} = 2\frac{4}{12} \\ + 1\frac{5}{12} = + 1\frac{5}{12} \\ \hline 3\frac{9}{12} = 3\frac{3}{4} \end{array}$$

So, $2\frac{1}{3} + 1\frac{5}{12} = 3\frac{3}{4}$. Since $3\frac{3}{4}$ is close to the estimate, 4, the answer is reasonable.

More Examples

A

$$\begin{array}{r} 2\frac{2}{3} = 2\frac{10}{15} \\ + 1\frac{4}{5} = + 1\frac{12}{15} \\ \hline 3\frac{22}{15} = 3 + 1\frac{7}{15} = 4\frac{7}{15} \end{array}$$

B

$$\begin{array}{r} 5\frac{7}{9} = 5\frac{7}{9} \\ + 4\frac{1}{3} = + 4\frac{3}{9} \\ \hline 9\frac{10}{9} = 10\frac{1}{9} \end{array}$$

C

$$\begin{array}{r} 14\frac{3}{4} = 14\frac{9}{12} \\ + 12\frac{1}{6} = + 12\frac{2}{12} \\ \hline 26\frac{11}{12} \end{array}$$

- Why is estimating a good method for checking your answer?

MATH IDEA Make a model or use the LCD to add mixed numbers.

Check

1. Explain why in Example B, $9\frac{10}{9}$ was renamed as $10\frac{1}{9}$.

Find the sum in simplest form. Estimate to check.

- | | | | | |
|---|--|--|--|--|
| 2. $\frac{1}{4}$
$+ 2\frac{1}{2}$
<hr/> | 3. $2\frac{5}{8}$
$+ 1\frac{1}{2}$
<hr/> | 4. $5\frac{1}{3}$
$+ 2\frac{1}{6}$
<hr/> | 5. $4\frac{5}{9}$
$+ 2\frac{2}{3}$
<hr/> | 6. $8\frac{5}{6}$
$+ 3\frac{1}{3}$
<hr/> |
| 7. $4\frac{5}{12} + 1\frac{1}{6}$ | 8. $1\frac{1}{5} + 3\frac{2}{5}$ | 9. $9\frac{3}{4} + 8\frac{1}{2}$ | 10. $9\frac{4}{5} + 2\frac{3}{10}$ | |

LESSON CONTINUES

Find the sum in simplest form. Estimate to check.

$$\begin{array}{r} 11. \quad 4\frac{2}{3} \\ + 2\frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 3\frac{1}{2} \\ + 1\frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 5\frac{7}{9} \\ + 3\frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 5\frac{2}{5} \\ + 1\frac{3}{10} \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 4\frac{7}{12} \\ + 1\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 2\frac{3}{5} \\ + 2\frac{3}{10} \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 3\frac{2}{3} \\ + 4\frac{1}{12} \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 5\frac{1}{6} \\ + 1\frac{11}{12} \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad 2\frac{1}{8} \\ + 3\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad 1\frac{1}{5} \\ + 1\frac{3}{4} \\ \hline \end{array}$$

$$21. \quad 7\frac{3}{4} + 4\frac{7}{12}$$

$$22. \quad 4\frac{5}{8} + 2\frac{1}{4}$$

$$23. \quad 5\frac{5}{8} + 2\frac{1}{4}$$

$$24. \quad 4\frac{3}{4} + 3\frac{5}{12}$$

$$25. \quad 6\frac{1}{3} + 3\frac{1}{4}$$

$$26. \quad 5\frac{11}{12} + 2\frac{1}{4}$$

$$27. \quad 4\frac{3}{4} + 2\frac{3}{8}$$

$$28. \quad 7\frac{1}{2} + 1\frac{1}{16}$$



ALGEBRA

Find the value of n . Identify the addition property used.

$$29. \quad 0 + n = 3\frac{1}{2}$$

$$30. \quad 5\frac{1}{3} + 8 = n + 5\frac{1}{3}$$

$$31. \quad \frac{2}{7} + (n + \frac{4}{7}) = (\frac{2}{7} + 6\frac{2}{7}) + \frac{4}{7}$$



ALGEBRA

Find the value of n .

$$32. \quad 4\frac{4}{5} + n = 4\frac{4}{5}$$

$$33. \quad n + n = 3\frac{1}{2}$$

$$34. \quad n + 2\frac{3}{5} = 4$$

$$35. \quad 3\frac{1}{6} + n = 11\frac{5}{6}$$

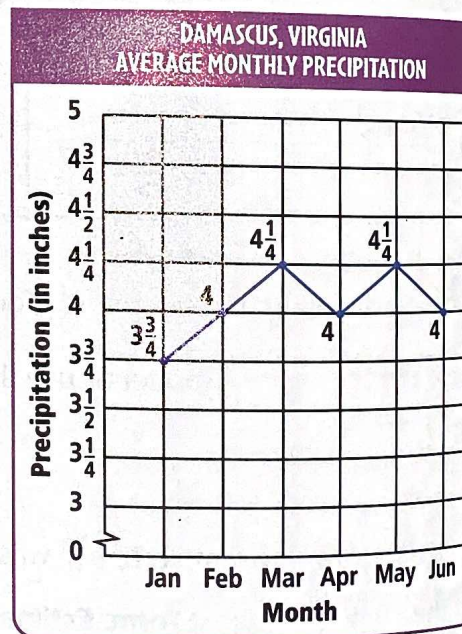
USE DATA For 36–38, use the line graph.

The Appalachian Trail goes through Damascus in southwest Virginia. Damascus is known as the “friendliest town on the Appalachian Trail.”

36. Does the precipitation in Damascus increase or decrease from January to March? Explain how you know.

37. Find the total precipitation for 3 consecutive months of the year, beginning in January.

38. Write a problem, using the information in the graph, that you can solve by adding mixed numbers.



39. This week, Amanda worked $2\frac{1}{2}$ hours on Monday, $1\frac{2}{3}$ hours on Tuesday, and $2\frac{1}{3}$ hours on Wednesday. How many hours did she work this week?

40. **Vocabulary Power** Sometimes companies advertise that they will give a free estimate. Explain what a free estimate is.

Subtract Mixed Numbers

Quick Review

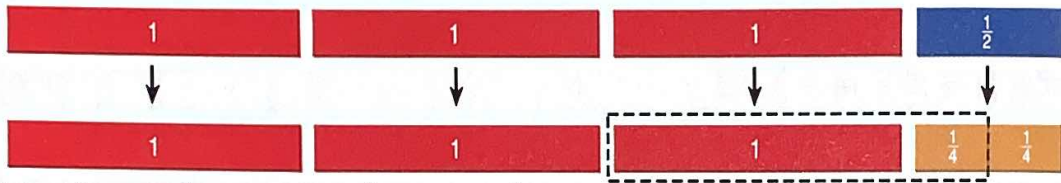
- $1 - \frac{1}{3}$
- $\frac{5}{6} - \frac{2}{3}$
- $\frac{2}{3} - \frac{2}{9}$
- $\frac{3}{4} - \frac{2}{3}$
- $1 - \frac{4}{5}$

Learn

ALL ABOARD! Jacob collects model trains. He is setting up the track for one of his models. He bought $3\frac{1}{2}$ feet of new track, but $1\frac{1}{4}$ feet of it were damaged. How many feet of new track were not damaged?

Example Subtract. $3\frac{1}{2} - 1\frac{1}{4}$
First, make an estimate. $3\frac{1}{2} - 1 = 2\frac{1}{2}$

One Way Use a model.



To subtract $1\frac{1}{4}$, replace the $\frac{1}{2}$ bar with $\frac{1}{4}$ bars.

$$\text{Subtract } 1\frac{1}{4}. \quad 3\frac{1}{2} - 1\frac{1}{4} = 3\frac{2}{4} - 1\frac{1}{4} = 2\frac{1}{4}$$

Another Way Use the LCD.

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

Find the LCD. Write equivalent fractions.
Subtract the fractions and the whole numbers.
Write the difference in simplest form.

So, $2\frac{1}{4}$ feet of new track were not damaged. Since $2\frac{1}{4}$ is close to the estimate of $2\frac{1}{2}$, $2\frac{1}{4}$ is reasonable.



▲ The Toy Train Museum in Kenner, Louisiana

You can also use a calculator that operates with fractions to subtract mixed numbers.

Check

1. Explain how you can tell your answer is reasonable when subtracting mixed numbers.



Technology Link

More Practice:
Harcourt Mega Math
The Number Games,
Tiny's Think Tank,
Level W

Find the difference in simplest form. Estimate to check.

$$2. \begin{array}{r} 5\frac{3}{4} \\ -2\frac{1}{8} \\ \hline \end{array}$$

$$3. \begin{array}{r} 9\frac{1}{2} \\ -2\frac{2}{5} \\ \hline \end{array}$$

$$4. \begin{array}{r} 5\frac{7}{9} \\ -3\frac{1}{9} \\ \hline \end{array}$$

$$5. \begin{array}{r} 3\frac{2}{3} \\ -1\frac{5}{12} \\ \hline \end{array}$$

Practice and Problem Solving

Extra Practice, page 380, Set B

Find the difference in simplest form. Estimate to check.

$$6. \begin{array}{r} 7\frac{11}{12} \\ -4\frac{5}{6} \\ \hline \end{array}$$

$$7. \begin{array}{r} 5\frac{5}{8} \\ -2\frac{1}{4} \\ \hline \end{array}$$

$$8. \begin{array}{r} 6\frac{1}{3} \\ -3\frac{1}{4} \\ \hline \end{array}$$

$$9. \begin{array}{r} 4\frac{7}{10} \\ -2\frac{3}{10} \\ \hline \end{array}$$

$$10. \begin{array}{r} 8\frac{3}{5} \\ -3\frac{3}{10} \\ \hline \end{array}$$

$$11. 5\frac{7}{12} - 4\frac{1}{3}$$

$$12. 6\frac{3}{4} - 2\frac{5}{16}$$

$$13. 3\frac{8}{9} - 1\frac{5}{9}$$

$$14. 7\frac{3}{5} - 2\frac{1}{4}$$



Find the value of n .

$$15. n - 1\frac{1}{2} = 3$$

$$16. 3\frac{5}{n} - 1\frac{3}{8} = 2\frac{1}{4}$$

$$17. 4\frac{3}{5} - n = 1\frac{2}{15}$$

$$18. 8\frac{n}{6} - 3\frac{1}{6} = 5\frac{2}{3}$$

USE DATA For 19–20, use the table.

19. How much longer is the S scale caboose than the HO scale caboose?
20. In which scale is the caboose $2\frac{7}{10}$ inches longer than a caboose in N scale?

MODEL TRAIN CABOOSE SIZES					
Scale	O	S	HO	N	Z
Size (in.)	6	$4\frac{1}{2}$	$3\frac{1}{3}$	$1\frac{4}{5}$	$\frac{3}{4}$

21. **What's the Error?** Marty compared the length of four Z scale cabooses with the length of one HO scale caboose. He said they are the same. Describe his error and write the correct answer.

Getting Ready for FCAT

22. Each week students volunteer at a local hospital. They record their hours in a table. Find the difference between the greatest number of volunteer hours and the least number of hours.

- A. $2\frac{1}{6}$ hours C. 3 hours
B. $2\frac{1}{3}$ hours D. $3\frac{1}{6}$ hours

MOUNT HOPE HOSPITAL	
Student	Volunteer Hours
George	$5\frac{2}{3}$
Jake	$3\frac{1}{2}$
Erica	$5\frac{1}{4}$
Tina	$2\frac{5}{6}$
Zach	$2\frac{1}{2}$