Finding a Common Denominator

Here are two ways of finding a common denominator when the largest denominator in an addition problem doesn't work.

1. **Multiply the denominators together.** This method always works, but sometimes it results in a common denominator that is larger than it needs to be.

2. **Go through the multiplication table of the largest denominator.** As you go through the multiplication table of the largest denominator, check each product. When you find the first product that can be divided evenly by the other denominators, you have found the lowest common denominator.

EXAMPLE 1 $\frac{2}{5} + \frac{3}{4} =$

STEP 1 Multiply the denominators. $5 \times 4 = 20$. 20 is the LCD. $\frac{2}{5} = \frac{8}{20}$

STEP 2 Raise each fraction to 20ths as on page 18. $+\frac{3}{4} = \frac{15}{20}$

STEP 3 Add the new fractions. $\frac{23}{20} = \mathbf{1\frac{3}{20}}$

STEP 4 Change the answer to a mixed number.

EXAMPLE 2 $\frac{2}{3} + \frac{5}{6} + \frac{3}{4} =$

STEP 1 Go through the multiplication table of the 6's. $\frac{2}{3} = \frac{8}{12}$
$6 \times 1 = 6$, which cannot be divided by 4.
$6 \times 2 = 12$, which can be divided by 3 and 4. $\frac{5}{6} = \frac{10}{12}$

STEP 2 Raise each fraction to 12ths. $+\frac{3}{4} = \frac{9}{12}$

STEP 3 Add the new fractions. $\frac{27}{12} = 2\frac{3}{12} = \mathbf{2\frac{1}{4}}$

STEP 4 Change the answer to a mixed number and reduce.

Add and reduce.

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

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

Applying Your Addition Skills

An addition problem may ask you to *combine* measurements or to find a *total.* Use estimation to find out whether an answer is reasonable.

Solve and write the correct label, such as inches or miles. Then round each fraction or mixed number to the nearest whole number and add the rounded numbers to estimate the answer.

1. Karen is $62\frac{1}{2}$ inches tall. Her mother is $5\frac{3}{4}$ inches taller. How tall is Karen's mother?

2. Doing errands on Monday, Mrs. Johnson drove $5\frac{1}{2}$ miles to the supermarket, $3\frac{7}{10}$ miles to the hardware store, $\frac{8}{10}$ mile to the laundromat, and $6\frac{1}{10}$ miles back home. What total distance did she drive?

3. Mr. Munro's empty suitcase weighs $4\frac{3}{4}$ pounds. The items he packed in his suitcase weigh $17\frac{3}{5}$ pounds. What was the weight of his suitcase when he filled it?

4. When Petra went shopping, she bought 2 pounds of sugar, $3\frac{1}{4}$ pounds of ground beef, $2\frac{2}{3}$ pounds of cheese, and a $\frac{7}{8}$-pound can of tomatoes. What was the total weight of her purchases?

5. John does carpentry part-time. One week he spent his evenings converting his neighbor's attic into an extra bedroom. Monday night he worked $3\frac{1}{2}$ hours. Tuesday night he worked $4\frac{1}{3}$ hours. Wednesday he worked $2\frac{3}{4}$ hours, and Thursday he worked $3\frac{2}{3}$ hours. How many hours did John work on the attic that week?

6. When Ruby was sick, her weight went down to $116\frac{1}{5}$ pounds. By the time she recovered, she had gained $12\frac{1}{2}$ pounds. What was Ruby's final weight when she was well?

7. Lois talked on the phone for $\frac{1}{2}$ hour this morning, $\frac{3}{5}$ hour in the afternoon, and $1\frac{2}{3}$ hours in the evening. How much time did Lois spend on the phone today?

Applying Your Subtraction Skills

A subtraction problem may ask you to figure out what is *left* after you take something away or to find how much something *increases* or *decreases*.

For problems 1 to 8, solve and write the correct label, such as inches or pounds, next to each answer. Reduce each answer to lowest terms. Then use rounding to estimate each answer.

1. From a board $38\frac{1}{2}$ inches long, Pete cut a piece $17\frac{5}{8}$ inches long. How long was the remaining piece?

2. Jeff weighed 166 pounds. He went on a diet and lost $11\frac{3}{4}$ pounds. How much did Jeff weigh after his diet?

3. Before leaving on a weekend trip, Mr. Green noticed that his mileage gauge registered $20{,}245\frac{3}{10}$ miles. When he returned home, the gauge registered $20{,}734\frac{7}{10}$ miles. How many miles did Mr. Green drive that weekend?

4. Adrienne works as a seamstress. From a piece of cloth 5 yards long, she used $1\frac{2}{3}$ yards to make a new curtain for her bathroom. How long was the remaining piece of cloth?

5. From a 10-foot long pipe, Shirley cut a section $1\frac{11}{12}$ feet long to repair her kitchen drain. How long was the piece of pipe that was left?

6. Tom changed the rotating speed of his cement mixer from $6\frac{1}{3}$ rpm's to 10 rpm's. By how many revolutions per minute did the speed of the mixer increase?

7. From a 100-pound bag of cement, Fred used $44\frac{5}{8}$ pounds to make concrete. How much cement was left in the bag?

8. Esther bought a $1\frac{3}{4}$-pound bar of baking chocolate. If she used $\frac{5}{8}$ pound of chocolate to make a cake, how much chocolate was left?

Read each of the following problems carefully to decide whether to add or to subtract.

Mr. Alonso bought 60 feet of nylon rope. To tie a mattress to the roof of his car, he used $18\frac{2}{3}$ feet of the rope. Then to pitch a tent for his son, he used $24\frac{1}{2}$ feet of rope.

9. How much rope did Mr. Alonso use to tie the mattress to the roof of his car and to pitch the tent?

10. After Mr. Alonso used the two pieces of rope, how much rope was left from the original 60 feet?

Mary ran $2\frac{3}{4}$ miles on Monday, $3\frac{3}{8}$ miles on Wednesday, and $1\frac{5}{8}$ miles on Friday.

11. How many miles did Mary run in the three days?

12. Mary tries to run 10 miles each week. How many more miles does Mary need to run to complete 10 miles?

A town needs \$3 million for a new recreation center. So far the town has received $\$\frac{3}{4}$ million from private gifts, $\$1\frac{1}{8}$ million from a state grant, and $\$\frac{1}{2}$ million from a federal grant.

13. What total amount has the town received so far?

14. How much more money does the town need to reach its goal?

Selma works for an airline. One of her duties is to check the size of each passenger's carry-on luggage. The airline allows carry-on bags with a combined length plus width plus height of no more than 37 inches.

15. Mrs. Burke's bag is $15\frac{3}{4}$ inches long, $9\frac{1}{2}$ inches wide, and $12\frac{7}{8}$ inches high. Does her bag fit within the guidelines for carry-on bags?

16. Mr. Burke's bag is $16\frac{1}{2}$ inches long, $8\frac{5}{8}$ inches wide, and $11\frac{3}{8}$ inches high. Does his bag fit within the airline's guidelines for carry-on bags?