1.1

Addition and Subtraction of Mixed Numbers
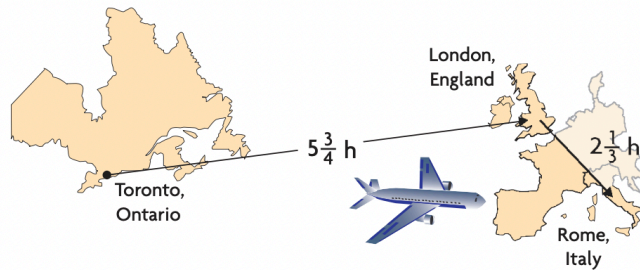
- fraction strips

GOAL

Add and subtract mixed numbers using a variety of methods.

LEARN ABOUT the Math

Alisa and Greg plan to travel from Canada to Italy for March break. Dawn is driving to her aunt's in Ottawa for March break. According to a travel website, Dawn's trip should take 4 h 36 min.

? **How many hours longer is Alisa and Greg's trip than Dawn's trip?**

EXAMPLE 1 | **Selecting a strategy to add mixed numbers**

Calculate the time to travel from Toronto to Rome by plane.

EXAMPLE 2 | **Selecting a strategy to subtract mixed numbers**

Calculate the difference in time between the trip to Rome and the trip to Ottawa.

EXAMPLE 3 | Using a number line to represent addition and subtraction
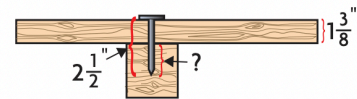
Evaluate.

a) $1\frac{2}{3} + 3\frac{1}{2}$

b) $4\frac{1}{8} - 1\frac{3}{4}$

EXAMPLE 4 | Solving a problem involving mixed numbers

Communication | *Tip*

In the imperial number system, the symbol " represents inches while the symbol ' represents feet.

If a $2\frac{1}{2}$ in. nail is hammered through a board $1\frac{3}{8}$ in. thick and into a support beam, how far into the support beam does the nail extend?
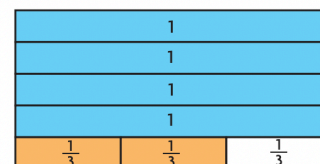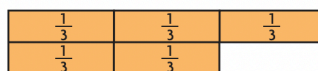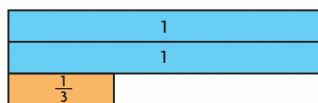
Homework:

CHECK Your Understanding

1. Use the diagrams to help you evaluate each expression.

    a) $2\frac{1}{3} + \frac{5}{3}$

    b) $5 - \frac{2}{3}$

2. Use fraction strips to explain how to evaluate each expression. What is the value of each expression?

a) $3\frac{5}{6} + 7\frac{1}{2}$

b) $9\frac{1}{8} - 6\frac{3}{4}$

PRACTISING

3. Use number lines to evaluate the following expressions.

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a) $7\frac{3}{8} + 4\frac{1}{8}$

c) $6\frac{2}{3} + 5\frac{2}{3}$

b) $7\frac{3}{8} - 4\frac{1}{8}$

d) $3\frac{2}{5} - 1\frac{4}{5}$

4. Between which two whole numbers will each sum lie?

a) $4\frac{1}{2} + 8\frac{1}{6}$

c) $4\frac{1}{3} + 12\frac{5}{8}$

e) $34\frac{7}{10} + 16\frac{3}{4}$

b) $3\frac{3}{4} + 6\frac{1}{5}$

d) $1\frac{4}{5} + 6\frac{2}{3}$

f) $11\frac{1}{2} + 41\frac{3}{5}$

5. Evaluate the expressions in question 4.

6. Estimate.

a) $3\frac{1}{2} - 1\frac{1}{5}$

c) $8\frac{1}{4} - 2\frac{1}{2}$

e) $29\frac{5}{8} - 23\frac{7}{16}$

b) $7\frac{3}{4} - 6\frac{1}{3}$

d) $4\frac{7}{8} - 3\frac{8}{9}$

f) $42\frac{1}{2} - 16\frac{2}{3}$

7. Evaluate the expressions in question 6.

8. Zofia spent $4\frac{1}{3}$ h weeding her garden on Monday and $1\frac{4}{5}$ h on Tuesday. How many hours did she spend weeding her garden altogether?

9. Alexis left her house at 7:45 p.m. to go shopping for clothes. She returned at 10:30 p.m.

a) Express the time in hours that Alexis spent away from home.

b) If Alexis spent $1\frac{1}{2}$ h shopping for clothes, then how much time did she spend doing other things?

10. A recipe for cookies calls for $1\frac{1}{2}$ c chopped dates, $\frac{3}{4}$ c water, $1\frac{1}{2}$ c sugar, $\frac{1}{2}$ c chopped nuts, $\frac{2}{3}$ c butter, and 3 c flour to be mixed together in a bowl. When these ingredients are combined, how many cups will there be altogether?

11. Determine two mixed numbers, with different denominators, that
T have the following properties.

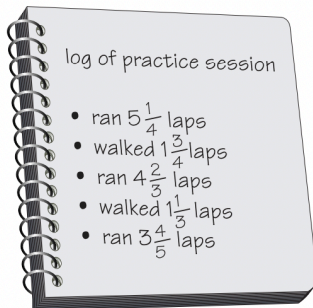   **a)** a sum of $3\frac{4}{5}$

    b) a difference of $3\frac{4}{5}$

    Explain how you chose your numbers.

12. Explain each of the following. You may use diagrams to show your
C explanations.

    a) Why is $3\frac{2}{5} - 1\frac{4}{7}$ the same as $\frac{3}{7} + 1\frac{2}{5}$?

    b) Why is $3\frac{2}{3} - 1\frac{5}{6}$ the same as $3\frac{5}{6} - 2$?

13. John trains by running on the school track. When he gets tired, he
A walks until he is able to run again. His log for one training day is shown to the left.

    a) Determine how many laps around the track John ran.

    b) Determine how many laps he walked around the track.

    c) Determine how many more laps John ran than he walked.

    d) If one lap around the school track is 400 m, determine the total distance John travelled.

log of practice session

- ran $5\frac{1}{4}$ laps
- walked $1\frac{3}{4}$ laps
- ran $4\frac{2}{3}$ laps
- walked $1\frac{1}{3}$ laps
- ran $3\frac{4}{5}$ laps

14. Jane is putting wood trim around a doorway like the one shown to the right. How many linear feet of wood will Jane need altogether? (Hint: 1 ft = 12 in.)

$38\frac{1}{8}"$

$7'\frac{9"}{16}$

15. a) Create an addition or subtraction question involving mixed numbers.

    b) How do you think most people would choose to solve your question: by creating equivalent fractions for the fraction parts, or by renaming the mixed numbers as equivalent improper fractions? Explain.