



Connect and Reflect

Key Ideas

- You need to decide which operation(s) to perform on fractions to solve problems.
- Some fraction problems involve the order of operations.
- The order of operations for fractions is the same as for whole numbers and decimals:
 - brackets first
 - multiply and divide in order from left to right
 - add and subtract in order from left to right

Practise

For help with #1 and #2, refer to Example 1 on page 165.

1. Calculate.

a) $\frac{3}{4} - \frac{1}{2} \times \frac{2}{3}$

b) $2\frac{1}{5} \div \left(\frac{4}{5} - \frac{1}{4}\right)$

c) $3\frac{1}{2} + 2\frac{1}{2} \times \left(1\frac{1}{4} - \frac{3}{4}\right)$

2. Calculate. Explain why your answer is reasonable.

a) $\left(\frac{5}{6} + \frac{2}{3}\right) \times \frac{3}{7}$

b) $\frac{1}{2} + \frac{3}{5} \div \frac{3}{4} \div \frac{2}{5}$

c) $1\frac{2}{5} \times 2\frac{1}{2} \div \left(1\frac{1}{8} - \frac{2}{3}\right)$

Apply

For help with #3, refer to Example 2 on page 166.

3. Leo earns \$16/h as a gardener in a city park. For time worked above 35 h in a week, he earns time-and-a-half. How much does he earn for each of the following numbers of hours worked in a week?

a) 36 h

b) 39 h

c) 42 h

d) $37\frac{1}{2}$ h

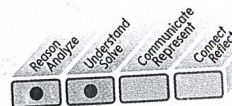
4. Two thirds of the land on a farm is used for grazing beef cattle. The rest of the land is used to grow crops. Half of the land for crops is used to grow corn. What fraction of the land on the farm is used to grow corn?

5. Melissa and Shinzo found $\frac{1}{2}$ a pitcher of iced tea in the fridge. They shared $\frac{3}{4}$ of the iced tea equally.

a) What fraction of a pitcher of iced tea did each of them drink?

b) What fraction of a pitcher of iced tea was left over?

6. Five sevenths of the 28 students in a grade 8 class visited a science museum on a field trip. How many students did not go on the trip? Solve the problem in two different ways.



7. Brass is an alloy that contains the metals copper and zinc. Copper typically accounts for $\frac{3}{5}$ of the mass of a piece of brass. This metal alloy has many uses, such as locks, doorknobs, and musical instruments.



- What is the mass of copper in 175 g of brass?
 - What mass of brass contains 90 g of copper?
 - What mass of brass contains 50 g of zinc?
8. The advertising space in a hockey team's yearbook is sold in fractions of a page. The table shows the advertising space sold in one edition of the yearbook.

Size of Advertisement	Price	Number Sold
$\frac{1}{2}$ page	\$110	3
$\frac{1}{4}$ page	\$60	5
$\frac{1}{8}$ page	\$35	12

Calculate the following.

- the total number of pages of advertising sold
 - the total revenue from advertising
 - the average revenue per page of advertising sold
9. Add one pair of brackets to the left side of each equation to make the equation true.

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

b) $1\frac{1}{2} + 2\frac{1}{2} \div \frac{3}{4} - \frac{1}{8} = 5\frac{1}{2}$

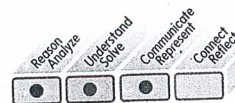
c) $\frac{2}{3} - \frac{1}{6} + \frac{5}{6} \div \frac{16}{9} = \frac{3}{4}$

10. **Competency Check** Here is a way of using four $\frac{1}{2}$ s and the order of operations to write an expression that equals 2:

$$\frac{1}{2} \div \frac{1}{2} + \frac{1}{2} \div \frac{1}{2}$$

Use four $\frac{1}{2}$ s and the order of operations to write expressions with each of the following values. Compare your expressions with those developed by your classmates.

- | | | |
|------------------|------------------|-------------------|
| a) 0 | b) 1 | c) $\frac{1}{4}$ |
| d) 3 | e) $\frac{1}{2}$ | f) 4 |
| g) $\frac{5}{8}$ | h) $\frac{5}{4}$ | i) $2\frac{1}{2}$ |



11. Ranjeet is entering a competition to win some gold coins. She must answer the following skill-testing question.

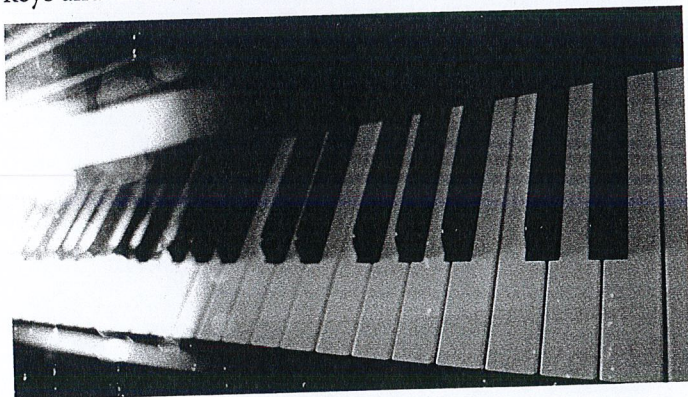
What is the value of $10 - 2 \times \frac{1}{2}$?

She is unsure if the correct answer is 4 or 9.

- Why might Ranjeet think the answer could be 4?
 - Why might Ranjeet think the answer could be 9?
 - What is the correct answer? Explain.
12. Dave and Manuel are comparing their solutions to the following problem. Three quarters of a number is 6. What is the number? Dave evaluates $\frac{3}{4} \times 6$ to get an answer of $4\frac{1}{2}$. Manuel evaluates $6 \div \frac{3}{4}$ to get an answer of 8. Which answer is correct? Explain.
13. Mia evaluates the expression $(\frac{1}{2} + \frac{1}{4}) \times \frac{5}{3}$ to equal $\frac{11}{12}$.
- What mistake did she make?
 - What is the correct value?

Extend

14. The average of four fractions is $\frac{2}{3}$. Three of the fractions are $\frac{1}{3}$, $\frac{1}{2}$, and $\frac{3}{4}$. What is the fourth fraction?
15. There are $1\frac{4}{9}$ times as many white keys as black keys on a full-sized piano keyboard. There are 88 keys altogether. Determine the number of white keys and the number of black keys.



16. Pedro's books are stored on three full shelves of different sizes. The small shelf holds $\frac{1}{2}$ as many books as the medium shelf. The medium shelf holds $\frac{1}{2}$ as many books as the large shelf. There are 224 books altogether. How many are on each shelf?