

Study Aid

- See Lesson 1.5, Examples 1 and 2.
- Try Chapter Review questions 17, 18, and 19.

Study Aid

- Try Chapter Review question 20.

FREQUENTLY ASKED Questions

Q: How do you apply the order of operations when working with rational numbers?

- A:** You use the same rules as you would use if working with integers or positive fractions or decimals. In order,
- computations in brackets
 - multiplication and division from left to right
 - addition and subtraction from left to right

For example,

$$\begin{aligned} & -3\left[\frac{1}{3} - \left(-\frac{2}{3}\right)\right] - 5 \div (-2) \\ & = -3(1) - 5 \div (-2) \\ & = -3 - (-2.5) \\ & = -0.5 \end{aligned}$$

Q: How can you predict whether the sum, difference, product, or quotient of two rational numbers will be greatest?

- A:** You have to consider whether the numbers are positive or negative. You also have to consider whether they are between -1 and 1 or not.

For example,

- If you add or subtract a negative, the difference will be greater than the sum.

$$5 - \left(-\frac{1}{2}\right) > 5 + \left(-\frac{1}{2}\right) \text{ since } 5\frac{1}{2} > 4\frac{1}{2}.$$

- If you multiply or divide a negative by a negative fraction between 0 and -1 , the product will be less than the quotient.

$$-3\left(-\frac{1}{2}\right) < (-3) \div \left(-\frac{1}{2}\right) \text{ since } \frac{3}{2} < 6.$$

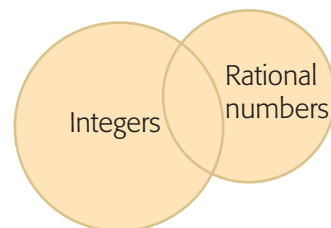
- If you multiply or divide a negative by a negative less than -1 , the product will be greater than the quotient.

$$(-3)(-2) > (-3) \div (-2) \text{ since } 6 > \frac{3}{2}.$$

Practice

Lesson 1.1

1. Locate each value on a number line.
a) -2.6 b) $-\frac{24}{5}$
2. Which rational is between -10 and -9 : $\frac{-29}{3}$ or $\frac{-31}{3}$? How do you know?
3. Write each as a quotient of integers.
a) -4.2 b) $1\frac{4}{5}$ c) $-\frac{3}{8}$
4. Describe a situation that the number $-1\frac{2}{3}$ might represent.
5. What is wrong with this Venn diagram?



Lesson 1.2

6. Order from least to greatest.
a) $-5.1, 0.3, \frac{-8}{3}, 1.2, -\frac{1}{5}$ b) $\frac{3}{5}, -\frac{2}{3}, \frac{-8}{9}, \frac{4}{7}, -\frac{1}{4}$
7. List three rational numbers between each pair of rationals.
a) $-4\frac{1}{3}$ and $-4\frac{3}{4}$ b) -5.01 and -5.006 c) $-\frac{4}{5}$ and $-\frac{2}{3}$
8. Explain why $-\frac{1}{2} > -\frac{8}{2}$ even though $1 < 8$.

Lesson 1.3

9. Ann started gym $\frac{2}{3}$ h before lunch. Her art class began an hour and a half after lunch. Lunch lasted $\frac{3}{4}$ h. Use a rational expression to tell how many hours before art class her gym class started.



10. Estimate. Show your reasoning.
- a) $-3\frac{1}{2} - \left(-8\frac{3}{4}\right)$ c) $-3.7 + (-17.1)$
 b) $\frac{8}{3} + \left(-\frac{17}{5}\right)$ d) $\frac{2}{3} + \left(-\frac{16}{5}\right)$
11. Calculate the sums and differences in question 10. Show your work.
12. A share price increased by \$0.05 one day, decreased by \$0.02 the next day, and decreased again by \$0.01 the following day. What was the total change?
13. The sum of two rational numbers is $-\frac{1}{2}$. The difference is $-\frac{11}{10}$. What are the two rational numbers?

Lesson 1.4

14. Calculate. Show your work.
- a) $-\frac{5}{2}\left(-\frac{4}{5}\right)$ c) $\left(1\frac{2}{3}\right)\left(-\frac{4}{9}\right)$ e) $\left(-\frac{6}{5}\right) \div \left(-\frac{2}{3}\right)$
 b) $\frac{2}{3}\left(-\frac{6}{5}\right)\left(-\frac{5}{3}\right)$ d) $\frac{2}{7} \div \left(-\frac{9}{14}\right)$ f) $(-3) \div \left(-1\frac{2}{3}\right)$
15. One share lost \$0.25. Another share lost \$0.03. What is the ratio of the losses? Write the ratio as a rational number.
16. The quotient of two rationals is -1.5 . The product is $-\frac{3}{32}$.
- a) What are the rationals?
 b) How do you know there has to be another possible answer?

Lesson 1.5

17. Calculate. Show your work.
- a) $\frac{2}{5} \div \left(\frac{-3}{5} + \frac{1}{10}\right)$ c) $\left(\frac{1}{8} + \frac{-2}{3}\right) \times \frac{12}{13}$
 b) $-\frac{5}{6} + \left(-\frac{2}{3}\right) \div \frac{3}{4}$ d) $-1\frac{1}{2} + \frac{-1}{-2} - \left(-\frac{3}{5}\right)$
18. Aaron calculated $-6.2 \div (3.1 + 1.9) \times (-2)$ as -9.8 . Is this correct? Explain.
19. Use a calculator to determine how much less $\left(-4 + \frac{3}{5}\right) \div \frac{2}{3}$ is than $\left(-4 + \frac{3}{5}\right) \times \frac{2}{3}$.

Lesson 1.6

20. Determine two rational numbers a and b so that
 $a \times b > a \div b > a - b > a + b$.

Lesson 1.7

21. The sum of three numbers is 1. One number is (-2) times another. The quotient of another pair of the numbers is 4. What are the numbers? Explain.