

FREQUENTLY ASKED Questions

Q: What strategies can you use to evaluate an expression involving rational numbers?

A: You can extend the same strategies and order of operations (BEDMAS) used for calculations with integers, fractions, and decimals to all rational numbers.

EXAMPLE

$$\begin{aligned}
 \frac{2\left(-1\frac{3}{4} + 1\frac{3}{5}\right)^2}{\left(-\frac{1}{10}\right)^3} &= \frac{2\left(-1\frac{15}{20} + 1\frac{12}{20}\right)^2}{\left(-\frac{1}{10}\right)^3} \\
 &= \frac{2\left(-\frac{3}{20}\right)^2}{\left(-\frac{1}{10}\right)^3} \\
 &= \frac{2\left(\frac{9}{400}\right)}{-\frac{1}{1000}} \\
 &= \frac{\frac{9}{200}}{-\frac{1}{1000}} \\
 &= \frac{9}{200} \times \frac{-5}{1} \\
 &= -45
 \end{aligned}$$

Study Aid

- See Lesson 1.6, Examples 1 and 3.
- Try Chapter Review Question 14.

PRACTICE Questions

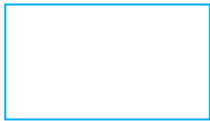
Lesson 1.1

- Calculate without using a calculator.
 - $1\frac{2}{3} + 9\frac{1}{2}$
 - $8\frac{1}{6} - 7\frac{2}{3}$
 - $4\frac{3}{8} + 2\frac{1}{4}$
 - $5\frac{5}{6} - 3\frac{3}{4}$
- A piece of wood $8\frac{7}{8}$ in. long is cut from a piece $45\frac{1}{2}$ in. long. If $\frac{1}{16}$ in. is wasted for the cut, how much wood is left?
- Stock shares of Champs Sporting Equipment opened at $12\frac{1}{8}$ and closed at the end of the day at $9\frac{1}{2}$. Calculate the change in the stock on this day.

Lesson 1.2

- Calculate without using a calculator.
 - $1\frac{3}{4} \times 3\frac{1}{2}$
 - $5\frac{7}{9} \times 6\frac{3}{4}$
 - $1\frac{2}{3} \div 4\frac{5}{6}$
 - $4\frac{3}{4} \div 9\frac{1}{2}$
- Calculate $\left(2\frac{2}{5}\right)^2$.
- Determine the volume of a cube that has a side length of $1\frac{3}{4}$ m.
- For the rectangle shown calculate:

$2\frac{2}{3}$ in.



 - the perimeter
 - the area

Lesson 1.3

- Use words to explain the different steps you would take to evaluate -8^2 and $(-8)^2$.

- Evaluate.

- $(-8 + 2)^2 \div (-4 + 2)^2$
- $\frac{(-16 + 4) \div 2}{8 \div (-8) + 4}$
- $16 - [3(6 - 3) - 12]$
- $\frac{20 + (-12) \div (-3)}{(-4 - 12) \div (-2)}$

- Evaluate.

- $x^2 - 4x$ for $x = -3$
- $yx^2 + xy$ for $x = -4$ and $y = 5$
- $\frac{-x^4 - 5x}{x + (-1)^3}$ for $x = -2$
- $\frac{-x^2 - y^2}{x^2 + y^2}$ for $x = 2$ and $y = 3$

Lesson 1.4

- Explain where each value is located on a number line.
 - -2.6
 - $-\frac{24}{5}$
- Which is a negative rational number between -10 and -9 ? How do you know?
 - $-\frac{29}{3}$
 - $-\frac{31}{3}$
- The temperature in Powassan was -4.8 °C. The temperature in Callander was $-4\frac{5}{6}$ °C. In which town was the temperature colder? Explain.
- Write these rational numbers in order from least to greatest.
 - $\frac{-3}{5}, \frac{1}{-3}, -1\frac{1}{3}$
 - $-\frac{2}{5}, -2\frac{1}{5}, \frac{4}{5}$
 - $0.7, -0.3, -0.\bar{3}$
 - $0, -1.5, -2$

15. Use $>$, $<$, or $=$ to make true statements. Explain how you know each statement is true.

a) $\frac{-2}{3} \blacksquare -\frac{5}{6}$ c) $-2\frac{1}{4} \blacksquare -\frac{9}{4}$
 b) $\frac{2}{3} \blacksquare \frac{5}{8}$ d) $\frac{2}{-5} \blacksquare \frac{3}{10}$

Lesson 1.5

16. The daily changes in selling price for a particular stock during a week were: $-\$4.50$, $-\$0.95$, $\$0.25$, $-\$2.36$, and $-\$3.72$. What was the average daily change in selling price for the stock during this week?



17. Calculate. Show your work.

a) $2\frac{1}{4} - 5\frac{1}{3}$ c) $-6\frac{3}{4}\left(5\frac{1}{9}\right)$
 b) $-5\frac{2}{5} + 2\frac{3}{4}$ d) $1\frac{3}{4} \div \left(-\frac{30}{49}\right)$

18. Create two other expressions that give the same answer as $-1\frac{3}{4}\left(5\frac{1}{3}\right)$.

19. Calculate.

a) $6.4 - 4.2 \times 1.5$
 b) $-12.4 + (-16.8) \div (-4.2)$
 c) $\frac{15.3 + 2.7 \div 3}{-2 \times 8.1}$
 d) $\frac{16 - 4.8 \times 2.1}{6 + 6 \div (-6)}$

20. Calculate.

a) $\frac{2}{5} \div \left(\frac{-2}{5} + \frac{1}{10}\right)$
 b) $\frac{-5}{6} + \frac{-2}{3} \times \frac{3}{4}$
 c) $\left[\frac{1}{8} + \left(\frac{-2}{3}\right)\right] \times \frac{12}{13}$
 d) $-1\frac{1}{2} + \frac{-1}{-2} - \frac{-3}{5}$

Lesson 1.6

21. Calculate.

a) $[5.12 - 3(4.1)]^3$
 b) $9.1^3 - 6.7^2$
 c) $-2\frac{1}{10} + \left(2\frac{3}{5} - 3\frac{1}{4}\right)^3$
 d) $-\frac{1}{4} \div \frac{5}{4} - 2\frac{1}{3} \div \left(-\frac{2}{3}\right)^3$

22. Mikka invests \$100 in an account earning interest at a rate of 4% every 6 months. Calculate the value of his investment at the end of 4 years.

23. Use $>$, $<$, or $=$ to make true statements. Explain how you know each statement is true.

a) $\left(\frac{1}{-2}\right)^3 \blacksquare \left(\frac{1}{2}\right)^2$ c) $(-0.5)^2 \blacksquare \left(\frac{1}{2}\right)^2$
 b) $\left(\frac{3}{4}\right)^2 \blacksquare \left(-\frac{1}{4}\right)^3$ d) $\left(\frac{3}{2}\right)^3 \blacksquare \left(\frac{3}{-2}\right)^4$

24. The area of a circle can be calculated using the formula $A = \pi r^2$, where $\pi \doteq 3.14$.

Calculate the area of each circle for each of the given radii. Round to the nearest tenth of a square unit.

a) $r = 5.2$ cm
 b) $r = 2\frac{5}{8}$ in.
 c) $r = 8.9$ m
 d) $r = 4\frac{2}{3}$ in.

25. Evaluate each expression for the given values.

a) $4a^2b^2$; $a = \frac{-2}{3}$, $b = -\frac{1}{2}$
 b) $(2ab)^2$; $a = -0.5$, $b = 1.2$
 c) $\left(\frac{2a}{5b}\right)^2$; $a = 1\frac{1}{2}$, $b = -\frac{2}{5}$
 d) $(3a - 2b)^3$; $a = -1.1$, $b = 2.2$