

Rational Number Route

Estimate, calculate, and check multistep rational-number situations.

GRADE 7 • 7.CE.1

7.CE.1 "The student will estimate, solve, and justify solutions to multistep contextual problems involving operations with rational numbers. Estimate, solve, and justify solutions to contextual problems involving addition, subtraction..."

NAME _____

DATE _____

ESTIMATE, THEN SOLVE

First make a quick estimate. Round decimals to whole numbers, and use benchmarks such as 0, $\frac{1}{2}$, and 1 for fractions. Then solve using the order of operations and compare your exact answer with your estimate to see whether it makes sense.

WORKED EXAMPLE

Estimate and solve: $-4.6 + 2.35 - (-1.2)$

1. Estimate: $-5 + 2 - (-1) = -2$.

2. Exact: $-4.6 + 2.35 = -2.25$.

3. Then $-2.25 - (-1.2) = -1.05$.

Answer: Estimate: about -2; exact answer: -1.05

PRACTICE 6 problems

1 Estimate by rounding to the nearest whole number, then solve: $-3.75 + 6.2 - 1.45$

ANSWER _____

2 Use fraction benchmarks to estimate, then solve: $\frac{5}{6} - (-\frac{1}{4}) + \frac{2}{3}$

ANSWER _____

3 Estimate, then solve: $(-2 \frac{1}{3}) \times \frac{3}{7} + \frac{5}{8}$

ANSWER _____

4 Estimate by rounding to the nearest whole number, then solve: $4.5 \div (-0.6) + 1.75$

ANSWER _____

5 Use fraction benchmarks to estimate, then solve: $-\frac{7}{9} \div \frac{14}{27} - \frac{1}{6}$

ANSWER _____

6 Use compatible numbers to estimate, then solve: $1.875 - (-2.4) \div 0.3$

ANSWER _____

APPLY IT Show your work

1

Your music app account starts at $-\$6.40$ because you owe that amount. You earn $\$18.75$ for helping at a school event. Then you and 3 friends split a $\$9.60$ headphone repair bill equally. Estimate your final account balance, find the exact balance, and write one sentence explaining why your answer is reasonable.

WORK SPACE

ANSWER _____

2

A student has $4\frac{1}{2}$ GB of free storage for a video project. The video files use $\frac{3}{4}$ GB, then the student deletes $1\frac{1}{4}$ GB of old files. The remaining free storage is split equally between 2 project folders. Estimate and find the exact amount of free storage in each folder.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A robotics team has $12\frac{1}{2}$ m of wire. It uses 3 pieces that are each $1\frac{3}{4}$ m long, then receives $1\frac{1}{4}$ m more wire. The team divides the wire left equally among 4 sensors. Estimate the wire for each sensor, find the exact amount, and explain why the exact answer is reasonable.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Estimate by rounding to the nearest whole number, then solve: $-3.75 + 6.2 - 1.45$	Estimate: 1; exact answer: 1
2	Use fraction benchmarks to estimate, then solve: $5/6 - (-1/4) + 2/3$	Estimate: about 2; exact answer: $7/4$, or $1 \frac{3}{4}$
3	Estimate, then solve: $(-2 \frac{1}{3}) \times 3/7 + 5/8$	Estimate: about 0; exact answer: $-3/8$
4	Estimate by rounding to the nearest whole number, then solve: $4.5 \div (-0.6) + 1.75$	Estimate: about -3; exact answer: -5.75
5	Use fraction benchmarks to estimate, then solve: $-7/9 \div 14/27 - 1/6$	Estimate: about -2; exact answer: $-5/3$, or $-1 \frac{2}{3}$
6	Use compatible numbers to estimate, then solve: $1.875 - (-2.4) \div 0.3$	Estimate: about 10; exact answer: 9.875

PART 2 • APPLY IT

- Estimate: about \$11; exact balance: \$9.95** There are 4 people sharing the bill, so the student's share is $\$9.60 \div 4 = \2.40 . Compute $-\$6.40 + \$18.75 - \$2.40 = \9.95 ; this is reasonably close to the estimate.
- Estimate: about 2 1/2 GB per folder; exact answer: 2 1/2 GB per folder** Compute $4 \frac{1}{2} - 3/4 + 1 \frac{1}{4} = 5$ GB of free storage. Divide 5 GB by 2 folders to get 2 1/2 GB per folder.

CHALLENGE

Estimate: about 2 m per sensor; exact answer: $2 \frac{1}{8}$ m per sensor. Since the team has a little more than 8 m left before dividing by 4, each sensor should receive a little more than 2 m.

Accept equivalent fraction, mixed-number, and decimal forms for exact answers. Estimates may vary when students use reasonable rounding or fraction benchmarks, as long as their method and comparison are sensible.