GRADE 7 · UNIT 3 · REVIEW

# Operations with Rational Numbers

## Unit Review

**MA.7.NSO.2.2 · MA.7.NSO.2.3**

*I can solve real-world problems with rational numbers using all four operations.*

*Notes, then boards. Seven times through.*

*Which operation does this situation call for, and how do I know the answer is right?*

**Every board is a practice-test question with new numbers.**

# Warm-Up

*On your own. Number your paper 1 to 4.*

1. A pool charges $8.00 to get in and $2.50 an hour. What do 3 hours cost?

2. Your account is at −$12.40. You deposit $30.00. What is the balance now?

3. $-7.2 \div 0.9$

4. Write the reciprocal of 7/10.

# Warm-Up

*Answers.*

1. $\$8.00 + 3 \times \$2.50 = \$15.50$

2. $-12.40 + 30.00 = \$17.60$

3. $-7.2 \div 0.9 = -8$

4. The reciprocal of 7/10 is 10/7.

# Notes

## I. Signs — Adding and Subtracting

A. Same signs: add, and keep the sign.

B. Different signs: subtract, and keep the sign of the number farther from zero.

C. **Subtracting a negative is adding. $-3-(-5)$ is $-3+5$.**

# Whiteboards · Question 1 of 12

*Boards up on three.*

$$-8.214 + (-3.75)$$

*Same signs. Add, and keep the sign.*

# Whiteboards · Question 1 of 12

*Answer.*

$$-8.214 + (-3.750) = -11.964$$

**−11.964**

# Whiteboards · Question 2 of 12

*Boards up on three.*

$$5\frac{2}{5} + 1.73$$

*Turn the mixed number into a decimal first.*

# Whiteboards · Question 2 of 12

*Answer.*

$$5\ 2/5 = 5.4$$

$$5.400 + 1.730 = 7.130$$

**7.13**

# Notes

## II. Multiplying, Dividing, and the Form of the Answer

A. Two negatives give a positive. One negative gives a negative.

B. Dividing by a fraction is multiplying by its reciprocal. A big fraction bar is a division sign.

C. **Answer exactly: an exact decimal, or a fraction in lowest terms. Never rounded.**

# Whiteboards · Question 3 of 12

*Boards up on three.*

$$-2\frac{5}{6} - \left(-\frac{3}{4}\right)$$

*Subtracting a negative is adding. Not an exact decimal — leave it a fraction.*

# Whiteboards · Question 3 of 12

*Answer.*

$$-17/6 + 3/4$$

$$-34/12 + 9/12$$

**$-25/12$, which is $-2\ 1/12$**

# Whiteboards · Question 4 of 12

*Boards up on three.*

$$\frac{-2\frac{4}{5}}{\frac{7}{10}}$$

*A big fraction bar is a division sign. Multiply by the reciprocal.*

# Whiteboards · Question 4 of 12

*Answer.*

$$-14/5 \times 10/7$$

$$-140/35$$

**$-4$**

# Notes

## III. What Is Missing Decides the Operation

A. Rate and time given, total missing — MULTIPLY.

B. Rate and total given, time missing — DIVIDE.

C. **Ask what you have and what you want before you compute.**

# Whiteboards · Question 5 of 12

*Boards up on three.*

**A submarine descends at 18.4 feet per minute and reaches −92 feet.**

**Which operation finds how long it took?**

**A ADD  B SUBTRACT  C MULTIPLY  D DIVIDE**

*Rate and total given. The time is what is missing.*

# Whiteboards · Question 5 of 12

*Answer.*

Descending, so the rate is −18.4 ft/min

$$-92 \div (-18.4)$$

**DIVIDE — 5 minutes**

# Whiteboards · Question 6 of 12

*Boards up on three.*

**A drone climbs at 27.5 feet per minute for 6 minutes.**

**Which operation finds how far it rose?**

**A ADD  B SUBTRACT  C MULTIPLY  D DIVIDE**

*Rate and time given. The total is what is missing.*

# Whiteboards · Question 6 of 12

*Answer.*

$$27.5 \times 6$$

**MULTIPLY — 165 feet**

# Notes

## IV. Change, and Departure from the Average

A. Change = final − beginning. Always that order.

B. A departure is ADDED to the average. A negative one lands below it.

C. **To compare two departures, subtract them — the average cancels.**

# Whiteboards · Question 7 of 12

*Boards up on three.*

**A hiker's elevation goes from 33.6 feet to −24.8 feet in 12 minutes.**

**What is the change in elevation?**

*Final minus beginning. It crosses zero.*

*Answer.*

$$-24.8 - 33.6$$

**−58.4 feet**

# Whiteboards · Question 8 of 12

*Boards up on three.*

**The month's average high is 74.5°F.**

**Thursday's departure is −6.2°F.**

**What was Thursday's high temperature?**

**A 6.2°F  B 68.3°F  C 74.5°F  D 80.7°F**

*A departure is added to the average.*

# Whiteboards · Question 8 of 12

*Answer.*

$$74.5 + (-6.2)$$

**68.3°F**

# Notes

## V. A Fraction Off, and Where the Charge Goes

A. One-quarter off means multiply by three-quarters. Do not subtract a quarter.

B. A charge is added on the DISCOUNTED price, not the original.

C. **Add the charge to the discounted price. Money has exactly two decimal places.**

# Whiteboards · Question 9 of 12

*Boards up on ten.*

**A coat costs $64.00. It is one-quarter off. A delivery charge of 0.06 times the discounted price is then added.**

**Find the discounted price, the charge, and the total.**

*Three lines, labeled. The charge goes on the discounted price.*

# Whiteboards · Question 9 of 12

*Answer.*

$$\$64.00 \times 3/4 = \$48.00$$

$$\$48.00 \times 0.06 = \$2.88$$

**$50.88**

# Notes

## VI. The One-Time Fee Comes Off First, Then Round Down

A. Take the joining fee off the total BEFORE you divide.

B. Divide what is left by the charge for one.

C. **Counting something you can only have whole? Round down.**

# Whiteboards · Question 10 of 12

*Boards up on ten.*

**A gym charges $10.00 to join and $4.25 a visit.**

**Marisol has $55.00 to spend.**

**How many visits can she afford?**

**A 10 visits  B 11 visits  C 12 visits  D 13 visits**

*The joining fee comes off first. Then round the way the story allows.*

# Whiteboards · Question 10 of 12

*Answer.*

$$\$55.00 - \$10.00 = \$45.00$$

$$\$45.00 \div \$4.25 \approx 10.59$$

**10 visits**

# Notes

## VII. Check the Answer Against the Story

A. Does the sign make sense? Does the size make sense?

B. Perfect arithmetic can still give a wrong answer.

C. **Subtract in the wrong order and the size is right but the sign is wrong.**

# Whiteboards · Question 11 of 12

*Boards up on ten.*

**The elevation changed from −254.8 feet to −131.6 feet.**

**Devon wrote:**

$$\text{change} = -254.8 - (-131.6) = -123.2 \text{ feet}$$

**Name his mistake, then give the correct change.**

*His arithmetic is perfect. Say it as: "His mistake was ___, so the correct change is ___."*

# Whiteboards · Question 11 of 12

*Answer.*

He did beginning − final.

$$-131.6 - (-254.8)$$

**+123.2 feet**

# Whiteboards · Question 12 of 12

*Boards up on ten.*

**A gym charges $9.00 to join and $3.25 a visit. Kaya has $60.00.**
**She wrote: 60.00 ÷ 3.25 ≈ 18.46, so 19 visits.**

**Select every statement that is true of Kaya's work.**

**A She never subtracted the $9.00 joining fee.**
**B Division is the wrong operation for this problem.**
**C She should have rounded down instead of up.**
**D Her division, 60.00 ÷ 3.25, was done wrongly.**
**E The correct answer is 15 visits.**

*More than one is true. Hold up every letter that applies — and be ready to defend one.*

# Whiteboards · Question 12 of 12

*Answer.*

$$\$60.00 - \$9.00 = \$51.00$$

$$\$51.00 \div \$3.25 \approx 15.69$$

**A, C and E — 15 visits**

# Before You Go

*The test is tomorrow.*

Part 1 is eight questions like the first four boards today. Exact answers.

Part 2 asks which operation before it asks for the number.

Part 3 is four word problems — three of the kinds you practiced today.

Part 4 gives you somebody else's work and asks what went wrong.

Two questions are new — one in Part 2, one in Part 3. Decide the operation, then check the sign.

Bring your own notes. You may use them.