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MASTERING RATIONAL NUMBERS:

REAL-WORLD EDITION!

3.75

4.20



Name: _____

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Name: _____

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Mastering Rational Numbers: Real-World Edition!

Welcome to your ultimate math challenge! Today, we are working with rational numbers (which are just numbers that can be written as fractions, decimals, or whole numbers).

Let's make this easy, relate it to real life, and have some fun along the way!

Quick Math Reminder

"For everything there is a season, and a time for every matter under heaven." — Ecclesiastes 3:1
Just like everything has its perfect time, every math problem has its perfect steps!

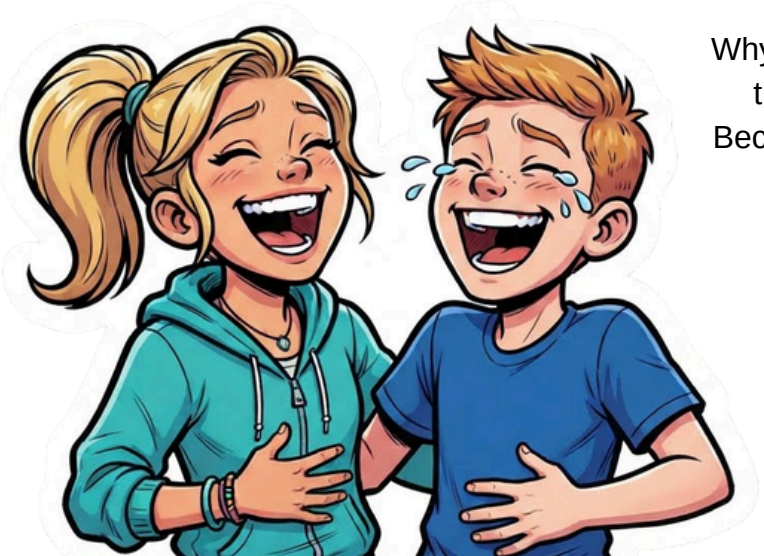
- **Adding/Subtracting Decimals:** Always line up your decimal points!
- **Multiplying Fractions:** Multiply straight across (Numerator × Numerator, Denominator × Denominator).
- **Dividing Fractions:** Keep, Change, Flip! (Multiply by the reciprocal).

Section 1: The Grocery Store Glitch (Decimals)

The Situation: You are buying snacks for a youth group game night. You have a $20.00 bill in your pocket. You pick up a bag of pretzels for $3.75, a gallon of lemonade for $4.20, and a container of chocolate chip cookies for $5.50.

Calculate the subtotal: How much do your snacks cost altogether?

Make the change: How much money will you get back from your $20.00 bill?



Why did the fraction hop off the playground slide? Because it wanted to get to its lowest terms!



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Advanced Rational Number

Quick Review: The Toolkit

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Reflection Word:

"Let all thingsbe done decently and in order." — 1 Corinthians 14:40

Just like building structural designs or managing communities, mathematics functions properly when everything follows its ordained, beautiful sequence!

Dad Joke Drop

Why did the order of operations go to school?
To learn how to keep its problems in line!





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Section 2: Noah's Miniature Ark (Fractions)

"And this is how you shall make it: The length of the ark shall be three hundred cubits..." — Genesis 6:15

The Situation: You aren't building a massive ark, but you are building a wooden model birdhouse! You have a wooden board that is 7⁄8 of a yard long. You need to cut it into pieces that are each 1⁄8 of a yard long.

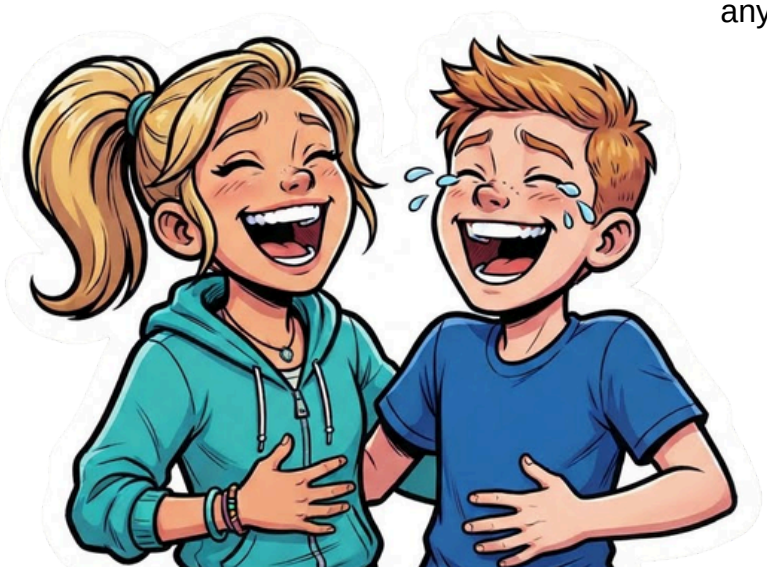
Divide the wood: How many complete birdhouse panels can you cut from your board? (Hint: Keep, Change, Flip!

Note: The original scenario is adjusted slightly to have simpler numbers for this layout context.)

7⁄ 8 ÷ 1⁄ 4 = 7⁄ 8 × 4⁄ 1 =

_____ panels

Did you hear the one about the negative number? He was so pessimistic, he just couldn't find anything positive to say!





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Section 3: The Deep Freeze (Negative Rational Numbers)

The Situation: You wake up early in the morning and notice the temperature outside is a freezing -4.5°F.

By lunchtime, the sun comes out and the temperature rises by 12.3°F.

Find the new temperature: What is the temperature at lunchtime?

-4.5 + 12.3 = _____°F

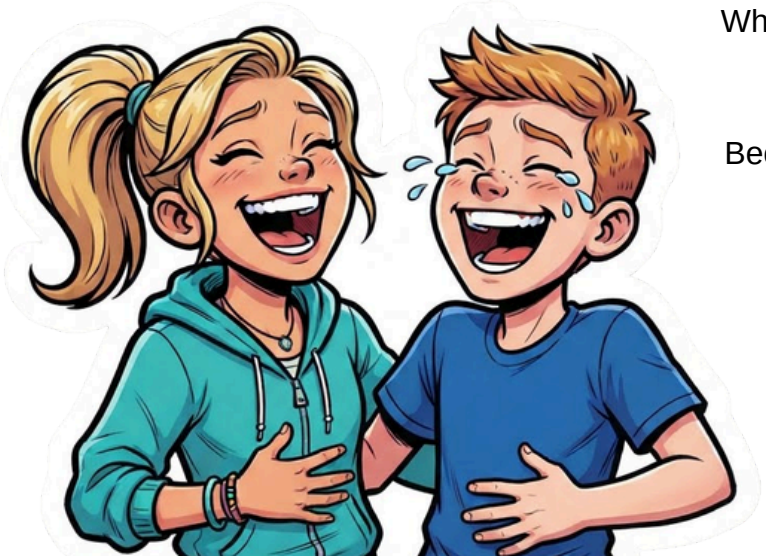
Section 4: The Shared Pizza (Fraction Multiplication)

"Two are better than one, because they have a good reward for their toil."
— Ecclesiastes 4:9

The Situation: Your family orders a giant pizza. There is 2⁄3 of the pizza left over in the fridge. You and your friend decide to split the leftovers, and you eat 1⁄2 of what was remaining.

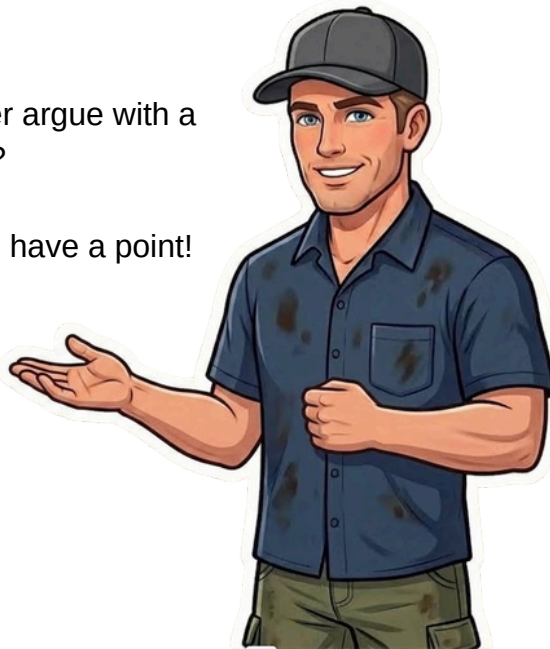
Multiply the fractions:
What fraction of the whole original pizza did you just eat?

1⁄2 × 2⁄3 = _____ of the whole pizza



Why should you never argue with a decimal?

Because they always have a point!



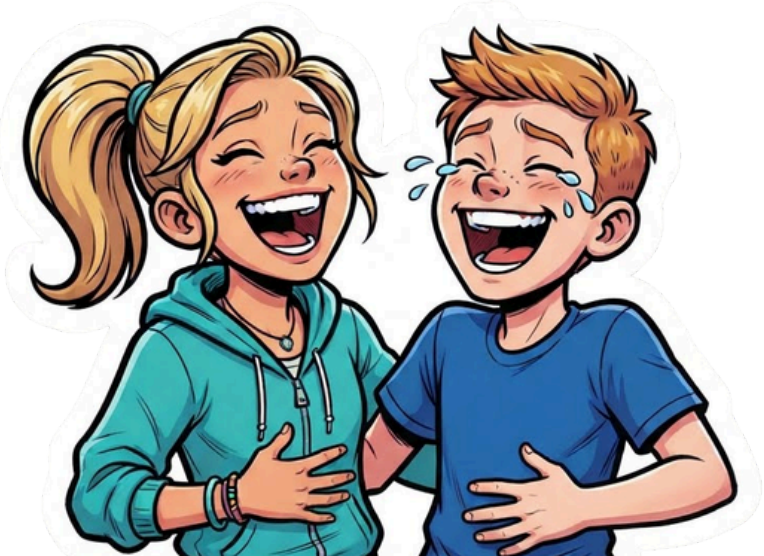
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Bonus Reflection: "Good measures, pressed down, shaken together, running over, will be put into your lap." — Luke 6:38

When you practice your math skills, you are learning how to be a great steward of your time, money, and resources. Keep up the amazing work!

Answer Key For Teachers & Parents
1. Grocery Subtotal: $13.45 ($3.75 + $4.20 + $5.50)
2. Grocery Change: $6.55 ($20.00 - $13.45)
3. Ark Wood Panels: 31⁄2 panels (meaning 3 complete panels with some left over)
4. Lunchtime Temperature: 7.8°F
5. Shared Pizza Portion: 1⁄3 of the original pizza (2⁄6 simplified)

Why did the negative integer go to therapy?
Because it was always feeling less than everyone else, but its therapist reminded it to just focus on its absolute value!





Name: _____
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The Scenario: A youth group decides to bake and sell artisan loaves of bread to fundraise for an upcoming mission trip.

- They spend **$45.50** upfront on professional baking pans.
- Ingredients cost them exactly **$2.25 per loaf**.
- They successfully bake and sell **32 loaves** for **$8.50 each**.
- At the end of the day, they decide to donate **1/4 of their net profit** to a local food pantry.

How much money does the youth group keep for their trip?

Setting Up the Expression:

Final Funds = [(32 × 8.50) - (45.50 + 32 × 2.25)] × (1 - 1/4)

Step-by-Step Solution:

Step 1 (Inner Parentheses - Ingredients Cost): Inside the costs group (45.50 + 32 × 2.25), multiplication takes priority.
32 × 2.25 = 72.00 ➔ 45.50 + 72.00 = 117.50
(The total cost running the sale is $117.50)

Step 2 (First Bracket - Gross Revenue & Net Profit): Look inside the left bracket [(32 × 8.50) - 117.50]. Perform the revenue multiplication first.
32 × 8.50 = 272.00 ➔ 272.00 - 117.50 = 154.50
(The net profit before charity donation is $154.50)

Step 3 (Right Parentheses - Fraction Kept): Simplify the keeping modifier.
1 - 1/4 = 3/4 = 0.75

Step 4 (Final Multiplication): Multiply the net profit by the fraction kept.
154.50 × 0.75 = 115.875

Result: Rounded to the nearest penny, the youth group keeps exactly $115.88 for their mission trip.

Name: _____
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The Scenario: A middle school science class launches a weather balloon from an initial ground altitude where the temperature is **52.4°F**.

- As it climbs into the troposphere, the temperature drops by **3.5°F every 1/2 mile**.
- The balloon climbs continuously for a total of **6.2 miles**.
- Suddenly, it hits a warm atmospheric inversion layer that causes the temperature to rise by **8.3°F**.

What is the final recorded temperature on the balloon's sensor?

🧱 Setting Up the Expression:

$$\text{Final Temp} = 52.4 - (6.2 \div 1/2) \times 3.5 + 8.3$$

🔎 Step-by-Step Solution:

Step 1 (Parentheses First - Elevation Steps): Solve the grouping$(6.2 \div 1/2)$ first to find how many half-mile intervals occurred.
$6.2 \div 0.5 = 12.4$ intervals

Step 2 (Multiplication next - Total Drop): Multiply the intervals by the temperature drop rate.
$12.4 \times 3.5 = 43.4°F$ total temperature drop

Step 3 (Addition & Subtraction Left to Right): Process remaining additions/subtractions sequentially.
First subtract: $52.4 - 43.4 = 9.0°F$
Next add the inversion layer: $9.0 + 8.3 = 17.3°F$

Result: The final recorded temperature on the sensor is 17.3°F.

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Example 3: Designing the Church Community Garden

The Scenario: A community church is building a rectangular shared garden plot.

- The outer boundary layout measures **12 1/2 feet long** by **8.4 feet wide**.
- To protect the soil, they install a heavy wooden structural frame around the inside edge, which reduces both the length and width dimensions by **1.2 feet on all sides**.

What is the exact square footage of actual plantable soil inside the border frame?

Setting Up the Expression:

Because the border frame takes off 1.2 feet from *both* ends of the length and *both* ends of the width, we must subtract the border twice (2 × 1.2) from each original dimension.

$$\text{Inner Area} = (12.5 - 2 \times 1.2) \times (8.4 - 2 \times 1.2)$$

Step-by-Step Solution:

Step 1 (Evaluate Parentheses - Length and Width Groups): Inside each set of grouping parentheses, multiplication takes priority over subtraction.
Length grouping: (12.5 - 2 × 1.2) ➔ 12.5 - 2.4 = 10.1 feet
Width grouping: (8.4 - 2 × 1.2) ➔ 8.4 - 2.4 = 6.0 feet

Step 2 (Final Multiplication): Multiply the simplified final length by the final width.
Area = 10.1 feet × 6.0 feet = 60.6

Result: The total plantable soil space inside the community garden frame is exactly 60.6 square feet.

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Problem 1: The Entrepreneur's Youth Group Bake Sale

The Situation: A youth group decides to bake and sell artisan loaves of bread to fundraise for a mission trip.
They spend $50.00 upfront on baking pans.
Ingredients cost them exactly $2.50 per loaf.
They successfully bake and sell 40 loaves for $9.00 each.
At the end of the day, they decide to give 1/5 of their net profit to a local food pantry.

Your Goal: Write out the full multi-step expression using the order of operations and calculate exactly how much money the group keeps for their trip

"Honor the Lord with your wealth and with the firstfruits of all your produce." — Proverbs 3:9



What did the zero say to the eight?
"Nice belt!"



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The High-Altitude Science Experiment The Situation:

A middle school science class launches a weather balloon from an initial altitude where the temperature is 58.6°F.
As it climbs, the temperature drops by 4.5°F every 1⁄2 mile.
The balloon climbs continuously for 4.2 miles.
Suddenly, it hits an inversion layer that causes the temperature to rise by 6.1°F.

Your Goal: Set up the expression using PEMDAS/GEMS and find the final recorded temperature on the balloon's sensor.



What did the zero say to the eight?
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Designing the Church Community Garden The Situation:

The community is building a rectangular shared garden plot.

The outer boundary of the garden area measures 14½ feet long by 9.2 feet wide.

To protect the soil, they must layer a wooden structural frame around the inner edge, which reduces both the length and the width by 1.5 feet on all sides (meaning you lose 1.5 feet on the left, right, top, and bottom).

Your Goal: Calculate the exact square footage of the actual plantable soil area inside the frame.

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Unit Rate

To find a unit rate, you need to divide the total quantity by the number of units to find out how many there are per single unit.
For your specific problem, you want to find out how many flowers are in one vase.

Step-by-Step Calculation:

- Identify your numbers:
  - Total quantity = 72 flowers
  - Number of units = 9 vases

1. Set up the division:

The unit rate is _____flowers per vase.

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Answer Key (For Teachers/Parents)

1. $168.00

- *Expression:* [(40 × 9.00) - (50.00 + 40 × 2.50)] × (1 - ⅛)
- *Steps:* [360.00 - (50.00 + 100.00)] × 0.8 → [360.00 - 150.00] × 0.8 → 210.00 × 0.8 = 168.00

2. 26.9°F

- *Expression:* 58.6 - (4.2 ÷ 0.5) × 4.5 + 6.1
- *Steps:* 58.6 - 8.4 × 4.5 + 6.1 → 58.6 - 37.8 + 6.1 → 20.8 + 6.1 = 26.9

3. 71.3 sq ft

- *Expression:* (14.5 - 2 × 1.5) × (9.2 - 2 × 1.5)
- *Steps:* (14.5 - 3) × (9.2 - 3) → 11.5 × 6.2 = 71.3