Decimal Detective: The Case of Simplifying Ratios!

Welcome, Detective Indie! Today we have a peculiar case: ratios that are hiding decimals! Our mission, should you choose to accept it, is to simplify these ratios and bring clarity to the numbers. This will make them much easier to work with!

Your Mission Objectives (What You'll Achieve Today):

- You'll learn to spot a ratio with tricky decimals.
- You'll master the technique to transform decimal parts of a ratio into clean whole numbers.
- You'll practice simplifying these new whole number ratios to their absolute simplest form.

Phase 1: Reconnaissance - What is a Ratio & Quick Recap

Remember, a ratio compares two quantities. For example, if you have 2 mystery novels and 3 science fiction booksslope, the ratio of mystery to sci-fi is 2:3.

Warm-up Case: Simplify the ratio 10:15. (Think: What's the biggest number that divides into both 10 and 15? That's the Greatest Common Factor, or GCF!)

(Pause for Indie to solve. Answer: GCF is 5. So, (10÷5):(15÷5) = 2:3)

Phase 2: Uncovering the Decimal Clues - The Core Technique

Sometimes, our ratios involve decimals. Our main goal is to get rid of those decimals to make simplifying easier!

The Golden Rule of Ratios: Whatever you do to one side of the ratio, you MUST do to the other side to keep it equivalent (balanced).

Case File #1: One Decimal Suspect

Let's say we have the ratio **0.5 : 2**.

1. **Identify the decimal:** 0.5 has one decimal place.
2. **Eliminate the decimal:** To make 0.5 a whole number, we multiply it by 10 (since there's one decimal place).
3. **Apply the Golden Rule:** Multiply the other part of the ratio by 10 as well.
   (0.5 × 10) : (2 × 10) becomes **5 : 20**.
4. **Simplify:** Now it's a simple whole number ratio! The GCF of 5 and 20 is 5.
   (5 ÷ 5) : (20 ÷ 5) becomes **1 : 4**. Case cracked!

Case File #2: Two Decimal Suspects

What about **1.2 : 0.03**?

1. **Identify the most decimal places:** 1.2 has one decimal place. 0.03 has two decimal places.

We go with the one that has MORE decimal places (0.03).
2. **Eliminate the decimals:** To make 0.03 a whole number, we need to move the decimal two places, so we multiply by 100.
3. **Apply the Golden Rule:** Multiply BOTH parts by 100.
(1.2 × 100) : (0.03 × 100) becomes **120 : 3**.
4. **Simplify:** The GCF of 120 and 3 is 3.
(120 ÷ 3) : (3 ÷ 3) becomes **40 : 1**. Another case solved!

Your Detective's Toolkit (The Strategy):

1. **Examine the evidence:** Look at the decimal numbers in your ratio. Find the number with the MOST decimal places.
2. **Choose your multiplier:**
    - If the most decimal places is 1, multiply both parts by 10.
    - If the most decimal places is 2, multiply both parts by 100.
    - If the most decimal places is 3, multiply both parts by 1000 (and so on!).
3. **Transform the ratio:** Perform the multiplication. You should now have a ratio of two whole numbers.
4. **Final step - Simplify:** Find the GCF of these two new whole numbers and divide both parts of the ratio by it.

Phase 3: Field Training - Guided Practice

Let's work these cases together, Detective Indie!

1. **Case: 0.8 : 4**
*(Guide Indie: One decimal place (0.8). Multiply by 10. (0.8*10):(4*10) -> 8:40. GCF is 8. -> 1:5)*
2. **Case: 1.5 : 0.5**
*(Guide Indie: Both have one decimal place. Multiply by 10. (1.5*10):(0.5*10) -> 15:5. GCF is 5. -> 3:1)*
3. **Case: 2 : 0.25**
*(Guide Indie: 0.25 has two decimal places. Multiply by 100. (2*100):(0.25*100) -> 200:25. GCF is 25. -> 8:1)*

Phase 4: Solo Missions - Independent Practice

Alright Detective, you're ready for some solo assignments! Simplify these ratios. Show your work (what you multiplied by, and the GCF).

- 1. 0.7 : 1.4
- 2. 3.5 : 7
- 3. 0.12 : 0.6
- 4. 1 : 0.05
- 5. 2.25 : 0.75
- 6. 0.002 : 0.01

(Allow Indie time to work. Provide answer key/check work afterwards.)

Phase 5: The Final Challenge - The Caper of the Super Smoothie!

Detective Indie, one final, tricky case has come in that needs your expert skills!

A top-secret recipe for a 'Mega Energy Smoothie' calls for special ingredients in a very precise ratio: **0.75 units of 'Zoom Berries' to 1.25 units of 'Power Powder'**.

To make this recipe easier for everyone to use, the client needs you to simplify this recipe ratio to its simplest whole number form. Can you crack the code?

0.75 : 1.25

*(Let Indie work this out. Solution: Both have 2 decimal places. Multiply by 100. (0.75*100):(1.25*100) -> 75:125. GCF of 75 and 125 is 25. (75÷25):(125÷25) -> 3:5. So, the simplified ratio is 3 units of Zoom Berries to 5 units of Power Powder.)*

Debriefing: Case Closed!

Absolutely brilliant work, Detective Indie! You've masterfully navigated the tricky terrain of decimal ratios and simplified them with precision. You've shown you can:

- Identify the correct multiplier to eliminate decimals.
- Apply it consistently to both parts of the ratio.
- Simplify the resulting whole number ratio like a pro!

You've successfully closed the case on simplifying ratios with decimals! Any questions about today's mission?