

Matthie Recalculation Path

Proportional Reasoning (Book 3)
Student Forms

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Built against Master Framework v1.1

Chapter 1 -- Strategy Studio

Form Ch1-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. A taxi charges a flat fee plus a per-km rate. Given only two (distance, cost) pairs, determine whether the relationship is proportional, and if not, find the flat fee.

2. Two students each claim a different quantity is 'the constant of proportionality' for the same table. Determine which student is correct and explain the other's error.

3. Build a real-world context where the constant of proportionality is a fraction less than 1, and explain what that constant means in words.

4. Given a graph with two labeled points, neither of which is the origin, determine whether the relationship could be proportional, and state what additional information would confirm it.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-RR-01

Form PR-RR-01-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A table shows (1,4), (2,8), (3,12). Is this relationship proportional? Show the check you used.

Tripwire

A shop charges a \$3 setup fee, then \$2 per item. At 2 items the cost is \$7; at 4 items it is \$11. Is this relationship proportional? Show how you know.

PR-RR-01 (continued)

Form PR-RR-01-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A gym charges no fee and \$5 per visit; another gym charges a \$10 membership plus \$5 per visit. Both show up as \$5/visit on a receipt. Which gym's total cost is proportional to number of visits?

Road Test

Without being told which chapter this is from: a delivery service's price list shows 2 packages for \$9 and 5 packages for \$22.50. Is pricing proportional to package count?

PR-RR-02

Form PR-RR-02-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

4 notebooks cost \$12. What is the cost of 7 notebooks?

Tripwire

6 pencils cost \$9. What do 10 pencils cost?

PR-RR-02 (continued)

Form PR-RR-02-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A runner covers 3 laps in 12 minutes at a constant pace. Explain, in words, how you would find the time for 7 laps -- don't just compute it.

Road Test

A recipe blog says 5 servings need 750 mL of broth. A reader wants to know the broth for 9 servings, without being told this is a unit-rate problem.

PR-RR-03

Form PR-RR-03-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A relationship is $y = 6x$. State what 6 means in a sentence using units.

Tripwire

A relationship is $y = 4.5x$. Explain what 4.5 means, using units.

PR-RR-03 (continued)

Form PR-RR-03-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Two runners' speeds are shown as points on separate graphs, each passing through the origin. One graph shows the point (2,14); state what the slope means for that runner, with units.

Road Test

A water tank's fill rate is described only as "9 liters every 3 minutes," with no chapter context given. Someone asks what this tells you about 1 minute. Answer in a full sentence.

Chapter 2 -- Strategy Studio

Form Ch2-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Two classes report the same fraction of students at an event. Given each class's total size, determine whether the actual number of students is the same, and explain why the fraction alone doesn't answer this.

2. Find a fraction of a quantity two ways: by computing the unit fraction first, and by an incorrect shortcut that stops early. Show both and explain what the shortcut is missing.

3. Compare two fractions with different denominators using a number line, then verify the same comparison using a common denominator, and confirm they agree.

4. Create a fraction greater than 1 and correctly place it on a number line, then explain why it can't sit between 0 and 1.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-FR-01

Form PR-FR-01-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Class A has $\frac{3}{4}$ of 20 students at an assembly. Class B has $\frac{3}{4}$ of 28 students at an assembly. Do the two classes have the same number of students there?

Tripwire

Two classes each report that $\frac{3}{4}$ of their students are at an activity. Do the two classes necessarily have the same number of students there? Explain.

PR-FR-01 (continued)

Form PR-FR-01-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A survey says $\frac{2}{3}$ of a school's teachers and $\frac{2}{3}$ of a school's students prefer online forms. The school has 40 teachers and 600 students. Is the number of people preferring online forms the same for both groups?

Road Test

Without naming a whole: " $\frac{1}{2}$ of the trees in Park A and $\frac{1}{2}$ of the trees in Park B are oaks." Is the number of oak trees necessarily the same in both parks?

PR-FR-02

Form PR-FR-02-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Find $\frac{3}{5}$ of 20.

Tripwire

Find $\frac{5}{6}$ of 24.

PR-FR-02 (continued)

Form PR-FR-02-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A charity keeps $\frac{2}{9}$ of every donation for overhead. If a donation is \$63, how much goes to overhead?

Show your steps as a story, not just numbers.

Road Test

A trail is $\frac{5}{8}$ finished after today's work. If the trail is 48 km total, how much is finished, presented with no mention of 'fraction of a quantity'?

PR-FR-03

Form PR-FR-03-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Which is greater, $\frac{3}{8}$ or $\frac{5}{12}$? Show the common reference you used.

Tripwire

Which is greater, $\frac{2}{5}$ or $\frac{3}{8}$? Show the common reference you used.

PR-FR-03 (continued)

Form PR-FR-03-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A juice recipe uses either $\frac{5}{9}$ cup or $\frac{7}{12}$ cup of concentrate, depending on the batch size chart. Which uses more concentrate per batch?

Road Test

Two containers are marked $\frac{4}{7}$ full and $\frac{3}{5}$ full. Without mentioning fractions or comparisons directly, ask which container has more room left.

Chapter 3 -- Strategy Studio

Form Ch3-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. A recipe scales by a fraction less than 1 for a smaller batch, then a different fraction for sharing among people. Find the final amount using both operations, and identify which was scaling and which was sharing.

2. Two fraction division problems use the same numbers but ask different questions (how many groups fit vs. what size is one group). Solve both and explain why the answers differ.

3. Create a subtraction problem where the two fractions already share a denominator, and a second where they don't. Explain why one requires an extra step.

4. A quantity is multiplied by a fraction greater than 1 in one problem and a fraction less than 1 in another. Predict which result is larger before calculating, then verify.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-FR-04

Form PR-FR-04-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A recipe for 1 batch uses $\frac{2}{3}$ cup of oats. How much oats for 5 batches?

Tripwire

Find $\frac{3}{4}$ of a $\frac{2}{3}$ -cup measure. Is your answer larger or smaller than $\frac{2}{3}$ cup? Explain.

PR-FR-04 (continued)

Form PR-FR-04-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A wall takes $\frac{5}{6}$ of a can of paint. A smaller wall needs $\frac{2}{3}$ of that amount. How much paint does the smaller wall need?

Road Test

A garden plot is $\frac{3}{4}$ of an acre. A farmer plants vegetables on $\frac{4}{5}$ of the plot, described with no scaling language at all.

PR-FR-05

Form PR-FR-05-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

$$\frac{1}{3} + \frac{1}{4} = ?$$

Tripwire

$$\frac{2}{5} + \frac{1}{3} = ?$$

PR-FR-05 (continued)

Form PR-FR-05-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A hiker walks $\frac{2}{3}$ of a trail on day one and $\frac{1}{4}$ more of the trail on day two. What fraction has the hiker covered after two days?

Road Test

Two paint cans hold $\frac{3}{10}$ and $\frac{1}{4}$ of a gallon. Combined, without mentioning 'add,' how much paint is that?

PR-FR-06

Form PR-FR-06-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

How many $\frac{3}{4}$ -cup servings fit in 6 cups?

Tripwire

How many $\frac{1}{2}$ -cup servings fit in 4 cups?

PR-FR-06 (continued)

Form PR-FR-06-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A ribbon is 9 meters long. Pieces of $\frac{3}{5}$ meter are cut from it. How many full pieces can be cut?

Road Test

A tank holds 10 liters. Bottles that hold $\frac{5}{6}$ liter each are being filled from it, phrased as a bottling-line question with no operation named.

Chapter 4 -- Strategy Studio

Form Ch4-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Given the same value expressed as a fraction, decimal, and percent with one form deliberately wrong, identify which one doesn't match and correct it.

2. Explain a real situation where a percent above 100% makes sense, and a different situation where it would not.

3. Convert a repeating decimal to a percent and explain how much precision is lost by rounding to the nearest whole percent.

4. Two students compare 0.6 and 60% and disagree about whether they're equal. Resolve the disagreement and explain the source of confusion.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-PC-01

Form PR-PC-01-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Write 0.7 as a percent, and write 7% as a decimal. Are these the same value?

Tripwire

Write 0.6 as a percent.

PR-PC-01 (continued)

Form PR-PC-01-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A spreadsheet cell shows 0.09. A student needs to enter the equivalent percent in a different cell. What should they type?

Road Test

A weather app shows a 0.3 chance of rain, with no percent sign anywhere. A friend asks what percent chance that is.

PR-PC-02

Form PR-PC-02-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A plant's height went from 20 cm to 45 cm. What percent of the original height is the new height?

Tripwire

A quantity grows from 40 to 90. What percent of the original amount is the new amount?

PR-PC-02 (continued)

Form PR-PC-02-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A stock price goes from \$40 to \$54. What percent of the original price is the new price?

Road Test

A town's population went from 2,000 to 5,000 over ten years, described purely as a population report with no percent language.

PR-PC-03

Form PR-PC-03-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

You want to compare a 25% discount and a $\frac{3}{10}$ discount. Which form would you convert to, and why?

Tripwire

Is $\frac{3}{4}$ or 80% the better way to describe a completion rate? Explain your choice.

PR-PC-03 (continued)

Form PR-PC-03-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

For adjusting a recipe that serves 8 to serve 3, would you rather work with a fraction or a decimal multiplier? Justify.

Road Test

A nutrition label and a sale sign both describe “25% of daily value” and “ $\frac{1}{4}$ off,” with no instruction to compare forms.

Chapter 5 -- Strategy Studio

Form Ch5-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Show 35% as a hundred-grid description, a fraction, and a decimal.

2. A class has 18 students and 6 are absent. Is the absence rate 6%, 18%, or another percent? Identify the whole first.

3. A student says 125% is impossible because percent cannot exceed 100. Give a context in which 125% makes sense.

4. Write a percent problem whose answer is exactly 12.5%. Then write a different problem with the same answer but a different whole.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-PC-04

Form PR-PC-04-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

40% of a class of 25 students are absent. How many students is that?

Tripwire

Find 30% of a group of 40 people.

PR-PC-04 (continued)

Form PR-PC-04-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A school has 150 students, and 60% are enrolled in music class. How many students is that?

Road Test

A batch of 80 cookies is described as 15% burnt, in a bakery-inventory note with no mention of percent-of-a-whole.

PR-PC-05

Form PR-PC-05-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Estimate 23% using the nearest benchmark. Which benchmark, and why?

Tripwire

Estimate 48% using the nearest benchmark (10%, 25%, or 50%). Which benchmark, and why?

PR-PC-05 (continued)

Form PR-PC-05-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A poll shows 63% support for a proposal. Round to the nearest 25% benchmark and explain your choice.

Road Test

A jar is estimated to be about 77% full, in a context with no mention of percent estimation strategy at all.

PR-PC-06

Form PR-PC-06-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A price increases by 20% from \$50. State both the change amount and the final amount.

Tripwire

A price increases by 15% from \$80. State both the change amount and the final amount.

PR-PC-06 (continued)

Form PR-PC-06-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A charity's donations increased by 60% from \$500. State the change amount and the final amount.

Road Test

A company's headcount grew from 200 to 320 employees, framed as an HR memo with no percent terms used.

Chapter 6 -- Strategy Studio

Form Ch6-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Given a single set of three numbers, write three different word problems: one where the percent is missing, one where the whole is missing, and one where the part is missing.

2. A student always multiplies regardless of what's missing. Create a problem where this produces a wrong answer, and explain what should have been done instead.

3. Find the whole given a part and a percent above 100%, and explain why the whole is smaller than the given part in this case.

4. Verify a part/whole/percent answer using substitution rather than repeating the original calculation, and explain why this is a stronger check.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-PC-07

Form PR-PC-07-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

“15 is what percent of 60?” Which quantity is missing: the part, the whole, or the percent?

Tripwire

“20 is 25% of what number?” Which quantity is missing: the part, the whole, or the percent?

PR-PC-07 (continued)

Form PR-PC-07-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

“45 students is 60% of the total enrolled.” Which quantity is missing?

Road Test

A recipe review says “9 reviewers out of the total gave 5 stars, which is 30% of everyone who reviewed,” with no percent-problem framing.

PR-PC-08

Form PR-PC-08-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

24 is 40% of what number? Solve, showing your operation choice.

Tripwire

Solve all three: (a) 30% of 50, (b) 15 is 30% of what number?, (c) 15 is what percent of 50?

PR-PC-08 (continued)

Form PR-PC-08-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

36 is 45% of what number? Solve.

Road Test

A jar of 250 marbles has some fraction removed, leaving 175. What percent were removed, asked with no mention of the three percent-problem types?

PR-PC-09

Form PR-PC-09-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

You found that 25% of 80 is 20. Verify this by substituting back.

Tripwire

You found that 18 is 25% of 72. Verify your answer without repeating the same division.

PR-PC-09 (continued)

Form PR-PC-09-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A classmate claims 32 is 40% of 80 and checks by dividing 32 by 80 again, getting 0.4 again. Is this a valid check? Explain.

Road Test

Someone calculates that 21 is 30% of 70 and wants to know if they're right, with no instruction on how to verify.

Chapter 7 -- Strategy Studio

Form Ch7-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. A price undergoes a discount and a tax in the same transaction. Determine the final price two ways: step-by-step and with a single combined multiplier, and confirm they agree.

2. Explain why a 20% markup followed by a 20% discount does not return to the original price, using a specific example.

3. Create a word problem where the percent change direction is easy to get backwards, and explain what makes it tricky.

4. A student treats a percent as a dollar amount directly. Construct a problem where this error is especially easy to make, and explain why.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-PC-10

Form PR-PC-10-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A \$40 item is discounted 25%. What is the sale price?

Tripwire

A \$60 item is discounted 30%. What is the sale price?

PR-PC-10 (continued)

Form PR-PC-10-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A \$90 jacket is discounted 15%. A friend says the sale price is \$75 because “you just subtract 15.” Is this correct? Explain.

Road Test

A phone bill of \$65 has a late fee of 8% added, mentioned in a household-budget note with no percent-problem framing.

PR-PC-11

Form PR-PC-11-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A price is marked up 15% from \$200. Does the price increase or decrease, and what is the new price?

Tripwire

An item is marked up 10% from \$50. Does the price increase or decrease, and what is the new price?

PR-PC-11 (continued)

Form PR-PC-11-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A \$120 service fee is discounted 5% for early payment. Does the price go up or down, and what's the new price?

Road Test

A savings account balance grows by 4% interest in one year, in a bank-statement description with no direction language.

PR-PC-12

Form PR-PC-12-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A \$50 item is discounted 20%. Solve two ways: (1) find the discount then subtract, (2) use a single multiplier. Do both methods agree?

Tripwire

A \$80 item is discounted 15%. Solve two different ways. Do your two methods agree?

PR-PC-12 (continued)

Form PR-PC-12-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A \$200 item is marked up 12%. Solve using both the add-the-markup method and the single-multiplier method ($\times 1.12$). Do they agree?

Road Test

Two students compute a 10% tip on a \$45 bill using different methods and get \$49.50 and \$50. Which is correct, and why does the mismatch matter?

Chapter 8 -- Strategy Studio

Form Ch8-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. A price is discounted, then taxed, then a loyalty discount is applied to the new price. Track the base at each of the three steps.

2. Explain why simple interest over 3 years is not the same as three separate one-year compound calculations, using numbers.

3. Create a reverse-percent problem (given the final amount, find the original) and explain why the forward operation would give a wrong answer if used directly.

4. A student says two opposite percent changes of the same size cancel out. Construct a counterexample with real numbers.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-PC-13

Form PR-PC-13-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A \$100 item is discounted 20%, then the discounted price is taxed 8%. What is the final price?

Tripwire

A \$100 item is discounted 20%, then the discounted price is taxed 8%. What is the final price? Show the base you used at each step.

PR-PC-13 (continued)

Form PR-PC-13-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A \$250 laptop is discounted 15%, then a 6% tax is added to the sale price. What is the final price?

Road Test

A store marks up wholesale cost by 40%, then offers a 10% loyalty discount on the marked-up price, framed as a pricing-strategy question with no 'base' language.

PR-PC-14

Form PR-PC-14-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A price increases 20%, then decreases 20%. Is the final price the same as the original?

Tripwire

A price increases 25%, then decreases 25%. Is the final price the same as the original? Show your work.

PR-PC-14 (continued)

Form PR-PC-14-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A price drops 30% then rises 30%. Is the result the original price? Show the intermediate value.

Road Test

A stock loses 50% of its value one year, then gains 50% the next, described purely as an investment story with no framing about combining percents.

PR-PC-15

Form PR-PC-15-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A \$500 result came from applying a 25% increase to an unknown original amount. Find the original amount.

Tripwire

A result of \$260 came from a 30% increase on an unknown original amount. Find the original amount.

PR-PC-15 (continued)

Form PR-PC-15-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

After a 4% annual simple interest rate for 3 years, a \$1000 deposit earns how much total interest?

Road Test

A final price of \$172.50 already includes a 15% tip. What was the bill before the tip, asked with no reverse-percent framing?

Chapter 9 -- Strategy Studio

Form Ch9-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Given a part-to-part ratio, write both corresponding part-to-whole fractions, and explain why they must add to 1.

2. Create a ratio where reversing the order changes which real-world quantity is described first, and explain the practical difference.

3. Simplify a ratio using a common factor that is not the greatest common factor, then show the fully simplified form and explain what was missed.

4. A tape diagram is drawn with unequal-sized boxes for a ratio. Explain what's wrong with the diagram and how to fix it.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-RR-04

Form PR-RR-04-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A group has a ratio of cats to dogs of 3:5. What fraction of the group are cats?

Tripwire

A ratio of red to blue marbles is 2:7. What fraction of the marbles are red?

PR-RR-04 (continued)

Form PR-RR-04-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A recipe ratio of butter to sugar is 4:5. What fraction of the mixture (by these two ingredients only) is sugar?

Road Test

A classroom has a ratio of 5 windows to 3 doors, mentioned in passing while describing the room, with no ratio-to-fraction instruction.

PR-RR-05

Form PR-RR-05-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A recipe ratio of flour to sugar is 3:2. If reversed to sugar:flour, what is the new ratio?

Tripwire

A ratio of red paint to blue paint is 5:3. What is the ratio of blue paint to red paint?

PR-RR-05 (continued)

Form PR-RR-05-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A fruit basket ratio of apples to oranges is 6:4. State the ratio of oranges to apples.

Road Test

A survey reports a 7:9 ratio of yes to no votes on a proposal. A follow-up question asks for the no-to-yes ratio, without using the word 'reverse.'

PR-RR-06

Form PR-RR-06-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Simplify the ratio 18:24 completely.

Tripwire

Simplify the ratio 16:24 completely.

PR-RR-06 (continued)

Form PR-RR-06-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Simplify the ratio 28:42 to its lowest terms.

Road Test

A survey of 36:54 people prefer two brands, mentioned in a marketing report with no instruction to simplify.

Chapter 10 -- Strategy Studio

Form Ch10-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Create two ratios that are additively related (same difference added to both parts) but not multiplicatively equivalent, and explain the distinction.

2. Given a ratio and a claimed equivalent ratio, verify equivalence by checking both parts' scale factors, not just one.

3. Scale a ratio by a non-whole-number factor and explain why the result is still a valid equivalent ratio.

4. Build a ratio table with four rows where one row secretly uses a different scale factor, and explain how to catch the error.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-RR-07

Form PR-RR-07-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Is 3:5 equivalent to 9:15?

Tripwire

Is 4:7 equivalent to 7:10? Explain.

PR-RR-07 (continued)

Form PR-RR-07-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Is a mixing ratio of 2:9 equivalent to 8:36? Justify with a scale factor, not addition.

Road Test

A paint mix uses 3 parts blue to 8 parts white. Someone suggests 9 parts blue to 14 parts white makes “the same shade,” with no equivalence language used.

PR-RR-08

Form PR-RR-08-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Is 4:9 equivalent to 12:27? Show the factor check for both parts.

Tripwire

Is 5:8 equivalent to 15:20? Check both parts.

PR-RR-08 (continued)

Form PR-RR-08-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Is 6:11 equivalent to 18:34? Check both parts' factors explicitly.

Road Test

A recipe scaled from 4:9 to 12:26 is questioned by a reader who “thinks something's off,” with no factor-checking instruction given.

PR-RR-09

Form PR-RR-09-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Are 8:12 and 10:15 equivalent? Use simplest form to justify.

Tripwire

Are 8:12 and 10:15 equivalent? Simplify both and explain why matching simplest forms confirms your answer.

PR-RR-09 (continued)

Form PR-RR-09-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Are 14:21 and 20:30 equivalent? Simplify both and explain what matching forms shows.

Road Test

Two recipe cards list flour-to-water ratios of 10:15 and 8:12, and a baker wonders if they're really the same recipe, with no simplification instruction given.

Chapter 11 -- Strategy Studio

Form Ch11-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Given a rate in one direction (km per hour), find the equivalent rate in the reverse direction (hours per km), and explain when each form is useful.

2. Create two situations with the same numbers where one calls for scaling a rate and the other for combining two separate quantities, and solve both.

3. A unit rate calculation gives a numerically correct answer with no units attached. Explain why this is an incomplete answer.

4. Compare two rates given in different units (e.g., mL per second vs. L per minute) and explain the conversion needed before comparing.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-RR-10

Form PR-RR-10-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A car travels 180 km in 3 hours. Find the speed in km per hour.

Tripwire

A recipe uses 5 cups of flour for 20 servings. How many cups of flour per serving?

PR-RR-10 (continued)

Form PR-RR-10-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A printer produces 250 pages in 10 minutes. State the rate in pages per minute.

Road Test

A well pumps 180 liters over 12 minutes, mentioned in a maintenance log with no unit-rate instruction.

PR-RR-11

Form PR-RR-11-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Store A: 10 pens for \$8. Store B: 15 pens for \$10.50. Which has the lower unit price?

Tripwire

Store A sells 6 apples for \$3. Store B sells 10 apples for \$4.50. Which store has the better price?
Show your work.

PR-RR-11 (continued)

Form PR-RR-11-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Brand X: 8 batteries for \$10. Brand Y: 12 batteries for \$16.20. Which has the lower unit price?

Road Test

A shopper sees a 3-pack of soap for \$4.50 and a 5-pack for \$7.25, and wonders which is the better deal, with no mention of unit rates.

PR-RR-12

Form PR-RR-12-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A recipe uses 2 cups flour for 8 servings. How much flour for 20 servings?

Tripwire

A pump fills 15 liters in 3 minutes. How much does it fill in 6 minutes total?

PR-RR-12 (continued)

Form PR-RR-12-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A conveyor belt moves 24 boxes in 4 minutes at a constant rate. How many boxes in 15 minutes total?

Road Test

A factory produces 40 units in 8 hours. How many in 20 hours, phrased in a production report with no rate language used?

Chapter 12 -- Strategy Studio

Form Ch12-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Given two deals with different package sizes and prices, determine the better value and explain why comparing totals directly would be misleading.

2. Create a scenario where the larger total price is actually the better deal, and explain what makes this case different from usual.

3. Compare two rates given in incompatible units and identify the conversion needed before any comparison is valid.

4. State a complete best-buy conclusion that includes both the computed unit rates and the final recommendation as separate parts.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-RR-13

Form PR-RR-13-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Brand A: 500 g for \$4. Brand B: 1.2 kg for \$9. Which is the better price per gram?

Tripwire

A student compares a 12-pack of juice boxes for \$6 to a single 2-liter bottle for \$3. Which is the better deal? Explain what you need to find out first.

PR-RR-13 (continued)

Form PR-RR-13-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Cereal A: 340 g for \$3.20. Cereal B: 500 g for \$4.80. Which has the lower price per gram?

Road Test

A shopper compares a 750 mL bottle at \$2.10 to a 1.5 L bottle at \$3.90, without being told to convert units first.

PR-RR-14

Form PR-RR-14-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Compare 4 notebooks for \$20 to 6 notebooks for \$24, stating both unit rates and your conclusion.

Tripwire

Compare two deals: 4 notebooks for \$20, and 6 notebooks for \$24. State both unit rates and your conclusion.

PR-RR-14 (continued)

Form PR-RR-14-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Compare 7 markers for \$10.50 to 12 markers for \$16.80, stating both unit rates and your conclusion.

Road Test

A parent is choosing between two multi-packs of juice boxes and asks a friend which is the better buy, and the friend just says “the bigger one,” with no rates mentioned.

Chapter 13 -- Strategy Studio

Form Ch13-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Solve the same proportion using two different methods (cross-products and unit rate) and confirm the answers agree.

2. Create a proportion where cross-multiplying non-corresponding terms gives a plausible but wrong answer, and explain the correct pairing.

3. Explain, with a specific example, why choosing a solving method should depend on the numbers given, not personal preference alone.

4. Justify why a specific relationship is not proportional using the zero-input test, not just a general claim.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-RR-15

Form PR-RR-15-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Solve for x: $\frac{3}{4} = x/20$.

Tripwire

Solve for x: $\frac{2}{5} = x/15$.

PR-RR-15 (continued)

Form PR-RR-15-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Solve for x: $\frac{7}{9} = x/36$.

Road Test

A scale drawing uses the relationship $\frac{5}{8} = x/40$ to find a missing length, presented as a drafting problem with no 'cross-products' instruction.

PR-RR-16

Form PR-RR-16-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Solve $\frac{4}{6} = x/9$ using both the scale-factor method and cross-products. Do they agree?

Tripwire

Solve a proportion of your choice two different ways. Do your two methods agree?

PR-RR-16 (continued)

Form PR-RR-16-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Solve $\frac{9}{12} = x/16$ using two different methods. Do they agree?

Road Test

A recipe conversion gives two different answers (14 and 16) for the same missing quantity using two methods, and a cook wants to know which to trust.

PR-RR-17

Form PR-RR-17-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A cost starts at \$5 with no items and increases by \$3 per item. Is this proportional? Justify.

Tripwire

A cost starts at \$5 with 0 items and increases by \$3 per item. Is this proportional? Name your specific evidence.

PR-RR-17 (continued)

Form PR-RR-17-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A cost starts at \$12 with 0 uses and stays exactly \$12 regardless of use count. Is this proportional?

Name your evidence.

Road Test

A subscription service charges the same amount every month regardless of usage, and a customer wonders if cost is proportional to usage, with no zero-input framing given.

Chapter 14 -- Strategy Studio

Form Ch14-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Given a table, a graph, and an equation, identify which two do not represent the same proportional relationship and explain how you found the mismatch.

2. Create a table with a constant difference but a non-constant quotient, and explain why 'the pattern goes up steadily' is not sufficient evidence of proportionality.

3. Build one proportional and one non-proportional equation that look superficially similar, and verify both using the origin test.

4. Given only a graph passing through the origin, determine what additional check is needed before concluding the relationship is proportional.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-RR-18

Form PR-RR-18-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A graph shows a line increasing steadily but crossing the vertical axis at (0,4), not the origin. Is this relationship proportional?

Tripwire

A table shows (1,6), (2,10), (3,14). Is this relationship proportional? Show both checks you used.

PR-RR-18 (continued)

Form PR-RR-18-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A graph passes through (0,0) and (5,5), (10,8). Is this relationship proportional? Justify with both checks.

Road Test

A phone plan's cost table shows (1,20),(2,40),(3,60), presented as a billing table with no mention of proportionality testing.

PR-RR-19

Form PR-RR-19-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A table shows (2,10), (4,20). The equation is $y=5x$. Identify k in both and confirm they match.

Tripwire

A table shows (2,10) and (4,20). An equation for the same relationship is $y = 5x$. Identify the constant k in both, and confirm they match.

PR-RR-19 (continued)

Form PR-RR-19-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A table shows (4,36) and a graph passes through (1,9). Are these the same proportional relationship? Identify k in each.

Road Test

A recipe's cost is described in a table, a graph, and a formula, and a reader asks whether all three describe the same situation, with no mention of a shared constant.

PR-RR-20

Form PR-RR-20-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Write one proportional and one non-proportional equation. Verify both against the origin test.

Tripwire

Write one proportional and one non-proportional table. Verify both.

PR-RR-20 (continued)

Form PR-RR-20-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Build a proportional and a non-proportional graph description for a different context than money or distance. Verify both.

Road Test

A student is asked to sketch two relationships, one that would work for a subscription-style pricing model and one for a pay-as-you-go model, with no proportionality vocabulary used.

Chapter 15 -- Strategy Studio

Form Ch15-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Given a scale (e.g., 1 cm = 15 km), convert a map distance to a real distance and a real distance to a map distance, and explain why the operations are opposite.

2. Given two figures, check every pair of corresponding sides for a consistent scale factor, and explain what a single-pair check would miss.

3. Create a scaling problem where the additive-shortcut error (adding rather than multiplying) produces a plausible but wrong length.

4. Explain why the scale factor for area is the square of the scale factor for length, using a specific pair of similar figures.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-RR-21

Form PR-RR-21-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A map uses $1 \text{ cm} = 8 \text{ km}$. The map shows 5 cm. What is the real distance?

Tripwire

A map uses $1 \text{ cm} = 10 \text{ km}$. A real distance is 65 km. How many cm is that on the map?

PR-RR-21 (continued)

Form PR-RR-21-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A blueprint uses 1 inch = 6 feet. The blueprint shows 3.5 inches. What is the real length?

Road Test

A model train is built at a scale where 1 cm represents 87 cm of real train, and a real train car is 17.4 m long. How long is the model, asked with no direction-of-conversion hint?

PR-RR-22

Form PR-RR-22-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Rectangle A is 4 by 6. Rectangle B is 6 by 9. Are they similar? Check all pairs.

Tripwire

Triangle A has sides 3, 4, 5. Triangle B has sides 6, 8, 9. Are they similar? Check every corresponding pair.

PR-RR-22 (continued)

Form PR-RR-22-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Rectangle A is 6 by 10. Rectangle B is 9 by 14. Are they similar? Check every pair.

Road Test

Two rectangular picture frames, 8x12 and 12x18 inches, are compared by a framer to see if one is a scaled version of the other, with no 'similar figures' language used.

PR-RR-23

Form PR-RR-23-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

A model is scaled up by a factor of 3. If the model's height is 5 cm, what is the real height?

Tripwire

A drawing is scaled by a factor of 4. Two side lengths are 6 cm and 4 cm. Find both scaled lengths.

PR-RR-23 (continued)

Form PR-RR-23-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

A blueprint is scaled by a factor of 8. Two room dimensions are 3.5 m and 2 m. Find both real dimensions.

Road Test

A model is built at 1:20 scale. Two real measurements of 4 m and 2.5 m need model-size equivalents, phrased as a modeler's question with no scaling formula given.

Chapter 16 -- Strategy Studio

Form Ch16-SS1

Name: _____ Grade: _____ Date: _____

These tasks vary the numbers, representation, unknown, or context. Do not choose a method from the chapter title alone.

1. Given four short scenarios (one each involving percent, ratio, rate, and scale), classify each by anchor model before solving any of them.

2. Create a mixed problem that superficially resembles a percent problem but is actually a ratio problem, and explain what signals the correct classification.

3. Solve a correctly classified problem, then verify it using that anchor model's own established check from its home chapter.

4. Explain, using a specific example, why classification must happen before calculation rather than after.

Student Self-Check

I identified the relationship by _____. The representation that made the structure clearest was _____. My answer is reasonable because _____.

PR-RR-24

Form PR-RR-24-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

“A jacket is 20% off.” Which anchor model applies, before calculating anything?

Tripwire

“Boys to girls is 3:4, total 28 students.” Before calculating anything, name which anchor model (percent, ratio, rate, scale, or proportionality) applies here.

PR-RR-24 (continued)

Form PR-RR-24-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

“A scale drawing uses $1 \text{ cm} = 3 \text{ km}$, and the drawing shows 7 cm .” Classify which anchor model applies before calculating.

Road Test

“A phone plan costs \$20 plus \$0.10 per text.” A customer asks whether the cost is proportional to number of texts, with no mention of anchor models or classification.

PR-RR-25

Form PR-RR-25-RF1

Name: _____ Grade: _____ Date: _____

Route Finder

Classified as a ratio problem: boys:girls=3:4, total 28. Solve for the number of boys.

Tripwire

A map scale is 1 cm = 20 km, and the map shows 4.5 cm. Solve for the real distance, and verify your answer.

PR-RR-25 (continued)

Form PR-RR-25-CF1

Name: _____ Grade: _____ Date: _____

Confirmation

Classified as a percent problem: a \$60 item is discounted 25%. Solve and verify.

Road Test

“A fruit stand sells apples at 3 for \$2, and a customer buys 12 apples,” asked as a plain word problem with no classification instruction given.
