



GRADE 6 · RATIOS & PROPORTIONAL RELATIONSHIPS · ANSWER KEY

EQUIVALENT RATIOS

Today's goal: I can use equivalent ratios to represent the relationship between two quantities.

How to use this key. Problem numbers match the student sheets. Each answer shows the steps and the slip Mr DJ sees most, so a wrong answer tells you what to reteach. Pepper levels: **Mild** warm-up, **Medium** stretch, **Spicy** challenge, **Extra Spicy** big brain.

Practice

8 problems + Mr DJ's worked example

Use: During the lesson after the mini-lesson/deck. The ramp (make → apply → justify) shows exactly where understanding breaks. **Timing:** 15–25 min · pairs or independent · circulate on items 6–9 (reasoning). Items 1–3 fluency, 4–6 application, 7–9 reasoning. Watch for additive thinking on items 3 & 4.

- 1 8:12 2 2:3 3 4:10, 6:15, 10:25 4 8 parts white ($3:2 = 12:8$) 5 e.g. $10:4 (\times 2)$ and $15:6 (\times 3)$
 6 Yes — both reduce to 2:3 7 10 — multiply both parts by 2 (since $4 = 2 \times 2$), so $5 \times 2 = 10$ 8 Yes — both reduce to 2:3

1 **MILD** Equivalent to 2:3, $\times 4$?

8:12

1. $2 \times 4 = 8$, $3 \times 4 = 12$.

Watch for: Scaled only one part.

2 **MILD** Equivalent to 10:15, $\div 5$?

2:3

1. $10 \div 5 = 2$, $15 \div 5 = 3$.

Watch for: Divided the parts by different numbers.

3 **MEDIUM** Table cups:servings 2:5 — 4, 6, 10 cups?

4:10, 6:15, 10:25

- Scale both parts by the same factor each row: $\times 2$, $\times 3$, $\times 5$.
- 4:10, 6:15, 10:25.

Watch for: Added 5 to servings each row instead of scaling with the ratio.

4 **MEDIUM** 3 blue : 2 white — white for 12 blue?

8 parts white ($3:2 = 12:8$)

- $12 \div 3 = 4$, so the scale factor is 4.
- White = $2 \times 4 = 8$.

Watch for: Added the difference ($12 - 3 = 9$, then $2 + 9 = 11$) instead of scaling by 4.

5 **MEDIUM** Two ratios equivalent to 5:2?

e.g. 10:4 ($\times 2$) and 15:6 ($\times 3$)

1. $\times 2 \rightarrow 10:4$.
2. $\times 3 \rightarrow 15:6$.

Watch for: Changed only one part, or added the same number to both.

6 **SPICY** Are 6:9 and 8:12 equivalent?

Yes — both reduce to 2:3

1. $6:9 \div 3 = 2:3$.
2. $8:12 \div 4 = 2:3$.
3. Same reduced ratio $\rightarrow$ equivalent.

Watch for: Compared the raw numbers without reducing to check.

7 **SPICY** Table 4 : ____ , ratio 2:5 — missing value + why multiply?

10 — multiply both parts by 2 (since $4 = 2 \times 2$), so $5 \times 2 = 10$

1. 4 is 2×2 , so the scale factor is 2.
2. Missing value = $5 \times 2 = 10$.
3. We multiply (not add) so the relationship stays the same.

Watch for: Added 2 (giving 7) instead of multiplying by the scale factor.

8 **EXTRA SPICY** Jordan: 4:6 = 6:9?

Yes — both reduce to 2:3

1. $4:6 \div 2 = 2:3$.
2. $6:9 \div 3 = 2:3$.
3. Same reduced form $\rightarrow$ equivalent.

Watch for: Said no by comparing raw numbers, or said yes for the wrong reason (e.g., a +2 pattern).

Homework

7 problems + Mr DJ's worked example

Use: Parallels the practice sheet one-to-one, reinforcing without re-teaching. The on-sheet worked example makes it independent. **Timing:** ~15 min at home · independent · review item 7 (a non-example) as the next-day warm-up.

1 12:15

2 2:3

3 6:4, 9:6, 12:8

4 5 parts yogurt ($4:1 = 20:5$)

5 e.g. 2:3 ($\div 3$) and 12:18 ($\times 2$)

6 Yes — both reduce to 3:4

7 No — $5:8 \times 2 = 10:16$, not 10:15

1 **MILD** Equivalent to 4:5, $\times 3$?

12:15

1. $4 \times 3 = 12$, $5 \times 3 = 15$.

Watch for: Scaled only one part.

2 **MILD** Equivalent to 12:18, $\div 6$?

2:3

1. $12 \div 6 = 2$, $18 \div 6 = 3$.

Watch for: Divided the parts by different numbers.

3 **MEDIUM** Table pencils:cost 3:2 — 6, 9, 12 pencils?

6:4, 9:6, 12:8

1. Scale both parts by $\times 2$, $\times 3$, $\times 4$.
2. 6:4, 9:6, 12:8.

Watch for: Added 2 to the cost each row instead of scaling.

4 **MEDIUM** 4 fruit : 1 yogurt — yogurt for 20 fruit?

5 parts yogurt ($4:1 = 20:5$)

1. $20 \div 4 = 5$, so the scale factor is 5.
2. Yogurt = $1 \times 5 = 5$.

Watch for: Added instead of scaling (e.g., 1 + 16).

5 MEDIUM Two ratios equivalent to 6:9?

e.g. 2:3 ($\div 3$) and 12:18 ($\times 2$)

1. $\div 3 \rightarrow 2:3$.
2. $\times 2 \rightarrow 12:18$.

Watch for: Changed only one part, or added the same number to both.

6 SPICY Are 9:12 and 6:8 equivalent?

Yes — both reduce to 3:4

1. $9:12 \div 3 = 3:4$.
2. $6:8 \div 2 = 3:4$.
3. Same reduced ratio $\rightarrow$ equivalent.

Watch for: Compared the raw numbers without reducing.

7 SPICY Sam: 5:8 = 10:15?

No — 5:8 $\times 2 = 10:16$, not 10:15

1. Scale 5:8 by 2 $\rightarrow 10:16$.
2. $10:16 \neq 10:15$, so they are not equivalent.

Watch for: Assumed doubling the first part is enough; didn't check that both parts scale by the same factor.

Exit Ticket

4 problems

Use: End of the equivalent-ratios lesson. 5–8 min, independent. One skill only — making and checking equivalent ratios.

Timing: 5–8 min · independent. Item 4 tests additive-vs-multiplicative thinking — the core misconception for this skill.

1 6:8

2 Yes — $\times 3$ on both parts

3 4:8 and 6:12

4 No — equivalent ratios scale by the SAME factor, not by adding

1 MILD Equivalent to 3:4, $\times 2$ both parts?

6:8

1. Multiply both parts by 2: $3 \times 2 = 6$, $4 \times 2 = 8$.
2. 6:8.

Watch for: Scaled only one part (e.g., 6:4) — both parts must be multiplied by the same number.

2 MILD Is 2:5 equivalent to 6:15?

Yes — $\times 3$ on both parts

1. $2 \times 3 = 6$ and $5 \times 3 = 15$.
2. Same factor on both parts $\rightarrow$ equivalent.

Watch for: Checked with addition ($2 \rightarrow 6$ is $+4$, $5 \rightarrow 15$ is $+10$) — equivalence is multiplicative, not additive.

3 MEDIUM Table bikes:wheels 1:2 — 4 bikes? 6 bikes?

4:8 and 6:12

1. Multiply both parts by 4 $\rightarrow 4:8$.
2. Multiply both parts by 6 $\rightarrow 6:12$.

Watch for: Added 2 to the wheels each row instead of scaling with the ratio.

4 SPICY Maria: 4:6 and 6:8 equivalent by adding 2 to each?

No — equivalent ratios scale by the SAME factor, not by adding

1. 4:6 reduces to 2:3; 6:8 reduces to 3:4.
2. $2:3 \neq 3:4$, so they are not equivalent.
3. Adding the same number to each part does not keep a ratio equivalent.

Watch for: Used additive thinking ($+2$ to each) instead of multiplicative; didn't check by reducing.

Lesson slides

teaching notes & timing

Slide	Time	What to do
1	0:00	Frame the single skill: make equivalent ratios and check them. Keep it short.
2	1:00	Hook — don't resolve yet. Let pairs argue whether B is A scaled up. Surface that both parts doubled.
3	3:00	Name the rule: multiply (or divide) BOTH parts by the same number. Anchor 'same number, both parts.'
4	5:00	WE1 — model scaling 3:4 up. Stress both parts use the same factor.
5	7:00	WE2 — ratio table; each row is the base ratio scaled. Connect rows to $\times 2$, $\times 3$, $\times 4$.

6	11:00	The #1 misconception: adding the same number to each part. Show 4:6 vs 6:8 reduce differently. Check by reducing.
7		Show the problem and the slip. Pairs: what went wrong, and what is the right answer? Take two answers before moving on.
8		Solve it together, one step at a time. It is also the worked example at the top of the practice sheet, so students can look back at it.
9	9:00	CFU — all-student response. Answer 8:12. Watch for scaling one part only. Whiteboards: everyone tries Mild, then climbs. These are #1, #3, #6 on the practice sheet.
10		Fingers up: 3 = got it, 2 = almost, 1 = not yet. Pull the 1s for a quick reteach while everyone else starts the practice sheet.
11	13:00	Launch the in-class practice sheet. Launch the practice sheet. Exit ticket in the last 5–8 minutes.