

GRADE 6 · THE NUMBER SYSTEM · ANSWER KEY

MULTIPLYING & DIVIDING DECIMALS

Today's goal: I can fluently multiply multi-digit decimals using the standard algorithm, fluently divide a multi-digit decimal by a whole number, fluently divide a whole number by a multi-digit decimal and fluently divide multi-digit decimals using the standard algorithm.



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. Items 5–8 all require shifting both points; item 8 is the multiply-by-less-than-1 surprise. **Timing:** 15–25 min · pairs or independent · circulate on 7–9. Items 1–3 fluency, 4–6 application, 7–9 reasoning.

- 1 0.21 2 1.2 3 10.53 4 1.2 5 6.3 6 8 — shift both two places to $600 \div 75$ 7 15 pieces
8 No — it is 0.72, which is less than 0.9

1 **MILD** $0.3 \times 0.7?$

0.21

1. $3 \times 7 = 21$; two places $\rightarrow 0.21$.

Watch for: Answered 2.1 — counted one place.

2 **MILD** $2.4 \times 0.5?$

1.2

1. $24 \times 5 = 120$; two places $\rightarrow 1.20 = 1.2$.

Watch for: Answered 12 or 0.12.

3 **MEDIUM** $4.05 \times 2.6?$

10.53

1. $405 \times 26 = 10530$; three places $\rightarrow 10.530 = 10.53$.

Watch for: Miscalculated the zero in 4.05 and got 105.3 or 1.053.

4 **MEDIUM** $8.4 \div 7?$

1.2

1. Divisor whole; $84 \div 7 = 12 \rightarrow 1.2$.

Watch for: Dropped the point $\rightarrow 12$.

5 MEDIUM $15.75 \div 2.5?$

6.3

1. Shift both one place: $157.5 \div 25$.
2. $157.5 \div 25 = 6.3$.

Watch for: Shifted only the divisor $\rightarrow 15.75 \div 25 = 0.63$.

7 SPICY 4.5 m ribbon into 0.3 m pieces?

15 pieces

1. $4.5 \div 0.3 \rightarrow$ shift both one place $\rightarrow 45 \div 3$.
2. $45 \div 3 = 15$ pieces.

Watch for: Multiplied $\rightarrow 1.35$; or shifted only one point $\rightarrow 1.5$.

6 SPICY $6 \div 0.75$, what shift?

8 — shift both two places to $600 \div 75$

1. 0.75 needs two shifts to become 75.
2. Shift the dividend the same amount: 6 becomes 600.
3. $600 \div 75 = 8$.

Watch for: Shifted only one number, or wrote 6 as 6.0 and shifted one place $\rightarrow 60 \div 7.5$.

8 EXTRA SPICY Leo: $0.8 \times 0.9 > 0.9?$

No — it is 0.72, which is less than 0.9

1. $8 \times 9 = 72$; two places $\rightarrow 0.72$.
2. $0.72 < 0.9$.
3. Multiplying by a number LESS than 1 makes the result smaller — 0.8 of something is only part of it.

Watch for: Applied 'multiplication grows', which only holds for factors greater than 1.

Homework

7 problems + Mr DJ's worked example

Use: Parallels the practice sheet one-to-one. **Timing:** ~15 min at home · independent · review item 6 (the shift) as the next-day warm-up.

1 0.3

2 1.28

3 6.97

4 1.2

5 15

6 20 — shift both two places to $900 \div 45$

7 8 strips

1 MILD $0.5 \times 0.6?$

0.3

1. $5 \times 6 = 30$; two places $\rightarrow 0.30 = 0.3$.

Watch for: Answered 3.0 — counted one place.

2 MILD $3.2 \times 0.4?$

1.28

1. $32 \times 4 = 128$; two places $\rightarrow 1.28$.

Watch for: Answered 12.8 or 0.128.

3 MEDIUM $2.05 \times 3.4?$

6.97

1. $205 \times 34 = 6970$; three places $\rightarrow 6.970 = 6.97$.

Watch for: Miscalculated because of the zero in 2.05.

4 MEDIUM $9.6 \div 8?$

1.2

1. $96 \div 8 = 12 \rightarrow 1.2$.

Watch for: Dropped the point $\rightarrow 12$.

5 MEDIUM $22.5 \div 1.5?$

15

1. Shift both one place: $225 \div 15 = 15$.

Watch for: Shifted only the divisor $\rightarrow 22.5 \div 15 = 1.5$.

6 SPICY $9 \div 0.45$, what shift?

20 — shift both two places to $900 \div 45$

1. 0.45 needs two shifts to become 45.
2. 9 becomes 900.
3. $900 \div 45 = 20$.

Watch for: Shifted one place only, or shifted the divisor without the dividend.

7 SPICY 6.4 m tape into 0.8 m strips?

8 strips

1. $6.4 \div 0.8 \rightarrow$ shift both one place $\rightarrow 64 \div 8$.
2. $64 \div 8 = 8$ strips.

Watch for: Multiplied $\rightarrow 5.12$; or partial shift $\rightarrow 0.8$.

Exit Ticket

4 problems

Use: End of the multiply/divide decimals lesson. 5–8 min, independent. **Timing:** 5–8 min · independent. Item 4 combines the shift-both-points rule with the dividing-by-less-than-1 surprise.

1 0.24

2 4.55

3 2.4

4 30 — you are counting how many 0.25s fit in 7.5, and 0.25 is small

1 MILD $0.6 \times 0.4?$

0.24

- $6 \times 4 = 24$.
- One decimal place + one decimal place = two $\rightarrow 0.24$.

Watch for: Answered 2.4 (counted only one place) or 0.024 (counted three). Count the places in BOTH factors and add.

2 MEDIUM $3.25 \times 1.4?$

4.55

- $325 \times 14 = 4550$.
- Two places + one place = three $\rightarrow 4.550 = 4.55$.

Watch for: Placed the point by lining up the factors instead of counting places $\rightarrow 45.5$ or 0.455 .

3 MEDIUM $9.6 \div 4?$

2.4

- Divisor is already whole; bring the point straight up.
- $96 \div 4 = 24 \rightarrow 2.4$.

Watch for: Dropped the decimal point entirely $\rightarrow 24$.

4 SPICY $7.5 \div 0.25$, and why bigger?

30 — you are counting how many 0.25s fit in 7.5, and 0.25 is small

- Shift both points two places: $750 \div 25$.
- $750 \div 25 = 30$.
- Dividing by a number LESS than 1 gives a larger result — there are thirty quarters in 7.5.

Watch for: Shifted only the divisor's point ($7.5 \div 25 = 0.3$), or distrusted the answer because 'division should shrink it.'

Lesson slides

teaching notes & timing

Slide	Time	What to do
1	0:00	Frame the skill: decimal placement in both operations.
2	1:00	Hook — three options on the board. Do NOT resolve. Collect a show of hands for each.
3	3:00	Name the multiply rule: ignore points, multiply, count places in both factors and add.
4	5:00	WE1 — resolve the hook (0.24). Then the first surprise: the product is smaller than either factor.
5	7:00	WE2 — the division shift. Stress BOTH points; shifting one is the #1 division error. Explain why it works (same ratio).
6	11:00	Put the two surprises side by side. The unifying move: ask what the operation means, don't trust 'bigger/smaller' intuition.
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 6.3. Watch for 0.63 (shifted only the divisor). 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.