



GRADE 6 · THE NUMBER SYSTEM · ANSWER KEY

MULTI-DIGIT DIVISION

Today's goal: I can fluently divide multi-digit whole numbers using the standard algorithm and fluently divide multi-digit whole numbers with a dividend of at least 4 digits.



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** big brain.

Practice

8 problems + Mr DJ's worked example

Use: During the lesson after the mini-lesson/deck. Items 3–5 both hide a trailing zero; items 6–9 are about interpreting and checking. **Timing:** 15–25 min · pairs or independent · circulate on 7–9. Items 1–3 fluency, 4–6 application, 7–9 reasoning. Contrast item 7 (round DOWN) with the exit ticket's bus item (round UP).

1 91 2 455 3 290 4 630 5 145 6 348 remainder 2 7 30 full boxes, 20 books left over

8 No — $12 \times 32 = 384$, nowhere near 4224. The answer is 132

1 **MILD** $728 \div 8?$

91

1. 8 into 72 = 9; bring down 8 → $8 \div 8 = 1$.

Watch for: Answered 96 or 9.1 — place-value slip.

2 **MILD** $4095 \div 9?$

455

1. $40 \div 9 = 4$ r4; $49 \div 9 = 5$ r4; $45 \div 9 = 5$.

Watch for: Dropped a digit → 45.

3 **MEDIUM** $8120 \div 28?$

290

1. $81 \div 28 = 2$ (56, r25); $252 \div 28 = 9$ (252, r0).

2. Bring down 0 → $0 \div 28 = 0$. Answer 290.

Watch for: Answered 29 — dropped the trailing zero.

4 **MEDIUM** $9450 \div 15?$

630

1. $94 \div 15 = 6$ (90, r4); $45 \div 15 = 3$; bring down 0 → $0 \div 15 = 0$.

Watch for: Answered 63 — dropped the trailing zero.

5 **MEDIUM** $3625 \div 25?$

145

1. $36 \div 25 = 1$ (25, r11); $112 \div 25 = 4$ (100, r12); $125 \div 25 = 5$.

Watch for: Estimation slip on the middle digit.

6 **SPICY** $2438 \div 7$ with remainder?

348 remainder 2

1. $24 \div 7 = 3$ (21, r3); $33 \div 7 = 4$ (28, r5); $58 \div 7 = 8$ (56, r2).

2. 348 r2. Check: $348 \times 7 = 2436$, + 2 = 2438.

Watch for: Reported the remainder as part of the quotient (3482) or dropped it entirely.

7 **SPICY** 980 books, boxes of 32?

30 full boxes, 20 books left over

1. $980 \div 32 = 30$ remainder 20.
2. $30 \times 32 = 960$; $980 - 960 = 20$.

Watch for: Rounded to 31 boxes — this question asks for COMPLETELY FULL boxes, so you round DOWN. Compare with the bus problem, where you round up.

8 **EXTRA SPICY** Is $4224 \div 32 = 12$?

No — $12 \times 32 = 384$, nowhere near 4224. The answer is 132

1. Check by multiplying back: $12 \times 32 = 384 \neq 4224$.
2. Estimate: $4224 \div 32 \approx 4200 \div 30 = 140$, so expect about 130–140.
3. $42 \div 32 = 1$ (32, r10); $102 \div 32 = 3$ (96, r6); $64 \div 32 = 2$. Answer 132.

Watch for: Accepted an answer without an estimate or a multiply-back check — the fastest way to catch a lost place value.

Homework

7 problems + Mr DJ's worked example

Use: Parallels the practice sheet. Every application item hides an interior zero — that is deliberate. **Timing:** ~15 min at home · independent · review item 7 as the next-day warm-up, contrasted with the bus problem.

1 109

2 402

3 406

4 705

5 403

6 329 remainder 1

7 23 full crates, 28 apples left

1 **MILD** $654 \div 6$?

109

1. 6 into 6 = 1; 6 into 5 won't go → write 0; bring down 4 → $54 \div 6 = 9$.

Watch for: Answered 19 — skipped the 0 instead of recording it.

2 **MILD** $3216 \div 8$?

402

1. $32 \div 8 = 4$; $1 \div 8 = 0$; $16 \div 8 = 2$.

Watch for: Answered 42 — dropped the middle zero.

3 **MEDIUM** $7308 \div 18$?

406

1. $73 \div 18 = 4$ (72, r1); $10 \div 18 = 0$; $108 \div 18 = 6$.

Watch for: Answered 46 — dropped the middle zero.

4 **MEDIUM** $8460 \div 12$?

705

1. $84 \div 12 = 7$; $6 \div 12 = 0$; $60 \div 12 = 5$.

Watch for: Answered 75 — dropped the middle zero.

5 **MEDIUM** $6045 \div 15$?

403

1. $60 \div 15 = 4$; $4 \div 15 = 0$; $45 \div 15 = 3$.

Watch for: Answered 43 — dropped the middle zero.

6 **SPICY** $1975 \div 6$ with remainder?

329 remainder 1

1. $19 \div 6 = 3$ (18, r1); $17 \div 6 = 2$ (12, r5); $55 \div 6 = 9$ (54, r1).
2. Check: $329 \times 6 = 1974$, $+ 1 = 1975$.

Watch for: Dropped the remainder or folded it into the quotient.

7 **SPICY** 1500 apples, crates of 64?

23 full crates, 28 apples left

1. $1500 \div 64 = 23$ remainder 28.
2. $23 \times 64 = 1472$; $1500 - 1472 = 28$.

Watch for: Rounded up to 24 — the question asks for COMPLETELY FULL crates, so round down and report the leftovers.

Exit Ticket

4 problems

Use: End of the multi-digit division lesson. 5–8 min, independent. **Timing:** 5–8 min · independent. Item 2 is the dropped-zero trap; item 4 is remainder-in-context (round UP).

1 117

2 420

3 91

4 27 buses (26 full, 2 students left over — you cannot leave them behind)

1 MILD 936 ÷ 8?

117

- 8 into 9 is 1 (r1); bring down 3 → $13 \div 8 = 1$ (r5).
- Bring down 6 → $56 \div 8 = 7$.
- 117, no remainder.

Watch for: Place-value slip (e.g. 17 or 1017) from misaligning the digits of the quotient.

2 MEDIUM 5040 ÷ 12?

420

- 12 into 50 = 4 (48, r2).
- Bring down 4 → $24 \div 12 = 2$.
- Bring down 0 → $0 \div 12 = 0$ — record the zero. 420.

Watch for: Answered 42 — dropped the final zero because ‘0 ÷ 12 is nothing.’ A zero still holds its place in the quotient.

3 MEDIUM 1274 ÷ 14?

91

- 14 into 12 won't go; 14 into 127 = 9 (126, r1).
- Bring down 4 → $14 \div 14 = 1$. Answer 91.

Watch for: Wrote 901 — inserted a zero that doesn't belong, or started dividing into 12 and lost a place.

4 SPICY 1250 students, buses of 48?

27 buses (26 full, 2 students left over — you cannot leave them behind)

- $1250 \div 48 = 26$ remainder 2.
- 26 buses carry 1248 students.
- 2 students still need a seat, so round UP to 27 buses.

Watch for: Answered 26 (ignored the remainder) or 26.04 (reported a decimal when the context needs whole buses). The remainder decides whether you round up.

Lesson slides

teaching notes & timing

Slide	Time	What to do
1	0:00	Frame the skill: accuracy plus remainder interpretation.
2	1:00	Hook — 42 vs 420. Do NOT resolve. The split in the room is the lesson; the dropped zero is the #1 error.
3	3:00	Name the cycle and the zero rule explicitly: too small to divide still earns a 0 in the quotient.
4	5:00	WE1 — work $5040 \div 12$ aloud, pausing hard at the final 0. Resolve the hook here: 420.
5	7:00	WE2 — the remainder decision. Two contexts, same arithmetic, different answers. Round up for buses, down for full boxes.
6	11:00	Teach the two checks (estimate, multiply back). This is what makes fluency self-correcting.
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 91. Watch for 901. 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.