



Dividing by two-digit divisors

GRADE 5 MATH

Answer keys for the exit ticket and practice worksheet, plus notes for the lesson slides. Each answer shows the steps and the most likely wrong answer (“If wrong”), so you can tell what a mistake means, not just that it is one. Questions go from **fluency** to **application** to **reasoning**.

Exit Ticket — answer key

Use: End of the two-digit-divisor lesson. Item 3 asks for the missing step AND two independent checks, and the second half is the assessment: a child who finds this error only when told where to look has learned nothing reusable, while a child who reaches for the estimate or multiplies back will catch the next one unprompted. Both checks are named in the standard itself — place value and the relationship between multiplication and division — so neither is an extra. Item 2's wrong answer, 30 remainder 40, is the one error on this sheet a child can detect with no outside information at all: a remainder at or above the divisor means another group fits. The missing zero here is the same idea as the interior zero in the “Multiplying multi-digit numbers” sheet (Grade 5) and the place-holding zero in the “Reading and comparing decimals” sheet (Grade 5) — a zero records “none of these”, and “none” has to be written down. Teaching the three as one claim is more efficient than three corrections.

Timing: 5–10 min · independent · no calculators.

1. 4872 / 24 with estimate and check **APPLICATION**

Answer: **estimate about 200; answer 203; check $24 \times 203 = 4872$**

1. Estimate: $5000 \div 25 = 200$, so expect a three-digit answer near 200.
2. 24 into 48 goes 2 times, leaving 0. Write 2.
3. Bring down the 7. 24 into 7 goes 0 times. Write 0 — this is the step that gets skipped.
4. Bring down the 2, making 72. 24 into 72 goes 3 times exactly. Write 3.
5. Quotient 203, no remainder. Check: $24 \times 203 = 4872$.

If wrong: Answered 23, omitting the 0 for the step where 24 would not go into 7. Nothing was miscalculated; a step whose answer was zero produced no digit, and the estimate of 200 was available to catch it.

2. 1000 / 32 FLUENCY

Answer: **31 remainder 8**

1. Estimate: $1000 \div 32$ is about $1000 \div 30$, a bit over 30.
2. 32 into 100 goes 3 times (96), leaving 4.
3. Bring down the 0, making 40. 32 into 40 goes 1 time, leaving 8.
4. So 31 remainder 8. Check: $32 \times 31 + 8 = 992 + 8 = 1000$.
5. The remainder 8 is smaller than 32, as it must be.

If wrong: Answered 30 remainder 40. The remainder is larger than the divisor, which means another 32 fits — and that is checkable with no other information, so it should never reach the page.

3. Ana's 23 REASONING

Answer: **she left out the 0 for the step where 24 does not go into 7; the estimate of about 200 shows 23 is the wrong size, and multiplying back gives $24 \times 23 = 552$ instead of 4872**

1. 24 into 48 is 2. Then the 7 is brought down, and 24 into 7 is none — that step still produces a digit, and the digit is 0.
2. Then $72 \div 24 = 3$. So the quotient is 203.
3. First way to catch it: the estimate. $5000 \div 25 = 200$, so the answer has three digits and 23 has two. That is a size error, visible before any digit is checked.
4. Second way: multiply back. $24 \times 23 = 552$, and the dividend was 4872 — nearly nine times bigger, so the quotient is nearly nine times short.
5. Both checks are in the standard's own description of the method, which is why neither is optional.

If wrong: Named the missing zero and gave one check, or gave the checks without saying which step was missed. The item asks for the step AND two checks, because a child who can only find this error when told to look for it has not gained anything reusable.

4. 20 r 20 against 20.20 REASONING

Answer: **because the remainder 20 is 20 TWENTY-FOURTHS, not 20 hundredths — 20 r 20 is 20.83, while 20.20 means twenty and twenty hundredths**

1. A remainder is what is left over, measured in the same units as the dividend, and it has to be compared with the DIVISOR to mean anything: 20 out of 24.
2. $20/24$ is about 0.83, so $500 \div 24$ is about 20.83.
3. Writing 20.20 puts the 20 in the hundredths places, claiming twenty hundredths, which is 0.2.
4. So the two differ by more than six tenths. A remainder and a decimal part are different kinds of thing, and the remainder only becomes a decimal after dividing it by the divisor.

If wrong: Said “you cannot write a remainder after a decimal point”. True as a rule and it does not say what went wrong; the answer wanted is that the remainder is a number of TWENTY-FOURTHS, so it has to be divided by 24 before it can be written as a decimal.

Quick answers for fast checking:

#	Level	Answer
1	application	estimate 200; 203; $24 \times 203 = 4872$
2	fluency	31 r 8; $32 \times 31 + 8 = 1000$
3	reasoning	the 0 step; the estimate and multiplying back
4	reasoning	the remainder is 20 twenty-fourths, so 20.83

Practice Worksheet — answer key

Use: In-class practice after the deck. Items 1–4 all carry a zero risk or an unfinished-division risk, and item 3 is the trailing-zero case, which children drop even more readily than an interior one because the division “feels finished”. Item 2 is worth normalising out loud: guessing 6 and finding $33 \times 6 = 198$ too big is not a mistake, it is the method working — which is item 9’s point and the reason the standard lists multiplication as part of how this is done. Item 5 forbids recalculating, like the “Multiplying multi-digit numbers” sheet (Grade 5) item 7, and it goes one better: EXACTLY ten times too small is the signature of a zero dropped from the end, while an interior one costs less (203 read as 23 is 8.8 times), so the estimate locates the missing zero rather than just rejecting the answer. Item 6’s answer must contain the REASON — a remainder of 40 tells you another 32 fits — because that is what turns the rule into something that locates an error. Item 7 reuses the “Multistep problems and remainders” sheet (Grade 4): 0.2 of a row does not exist.

Timing: 20–25 min · pairs · no calculators · items 2, 5 and 9 on the board.

1. 966 / 42 **FLUENCY**

Answer: **estimate about 24 (1000 / 40); answer 23; check $42 \times 23 = 966$**

1. Estimate: $1000 \div 40 = 25$, so about 25 — a two-digit answer.
2. 42 into 96 goes 2 times (84), leaving 12.
3. Bring down the 6, making 126. 42 into 126 goes 3 times exactly.
4. 23, no remainder. Check: $42 \times 23 = 966$.

If wrong: Answered 2 r 126 — stopped after one step. The estimate of about 25 says the answer has two digits, so an answer of 2 is incomplete rather than wrong.

2. 8415 / 33 **FLUENCY**

Answer: **estimate about 250 (8000 / 32); answer 255; check $33 \times 255 = 8415$**

1. Estimate: $8400 \div 33$ is about $8400 \div 30 = 280$, so somewhere around 250–280.
2. 33 into 84 goes 2 times (66), leaving 18.
3. Bring down the 1, making 181. 33 into 181 goes 5 times (165), leaving 16.
4. Bring down the 5, making 165. 33 into 165 goes 5 times exactly.
5. 255, no remainder. Check: $33 \times 255 = 8415$.

If wrong: Guessed 6 for the middle digit: $33 \times 6 = 198$, which is more than 181. Trying a guess and finding it too big is normal here — with a two-digit divisor the digit is always a guess, and multiplying is how you test it.

3. 2050 / 41 **FLUENCY**

Answer: **estimate about 50; answer 50; check $41 \times 50 = 2050$**

1. Estimate: $2000 \div 40 = 50$.
2. 41 into 205 goes 5 times exactly (205), leaving 0.
3. Bring down the 0. 41 into 0 goes 0 times — write the 0.
4. 50, no remainder. Check: $41 \times 50 = 2050$.

If wrong: Answered 5, dropping the final 0. A trailing zero in a quotient is left out just as readily as an interior one, and the estimate of 50 catches it.

4. 7225 / 25 **FLUENCY**

Answer: **estimate about 290 (7250 / 25); answer 289; check $25 \times 289 = 7225$**

1. Estimate: $7000 \div 25 = 280$, so just under 300.
2. 25 into 72 goes 2 times (50), leaving 22.
3. Bring down the 2, making 222. 25 into 222 goes 8 times (200), leaving 22.
4. Bring down the 5, making 225. 25 into 225 goes 9 times exactly.
5. 289. Check: $25 \times 289 = 7225$.

If wrong: Answered 28 r 225 — the last step abandoned because 225 “looked like a remainder”. 225 is more than 25, so the division was not finished.

5. 2050 / 41 = 5 is wrong **REASONING**

Answer: **the estimate is about 50, so the answer should have two digits — 5 is about ten times too small**

1. $2000 \div 40 = 50$.
2. 5 has one digit; 50 has two. So the answer is the wrong size before any digit is checked.
3. Being EXACTLY ten times too small is the signature of a zero dropped from the END. A zero dropped from the middle costs less than ten — 203 read as 23 is only 8.8 times — so the factor tells you where to look.
4. Multiplying back would confirm it: $41 \times 5 = 205$, which is a tenth of 2050.

If wrong: Recalculated the division to show 50. That proves it wrong and the item asked for the estimate only — and “ten times too small” points straight at a missing zero, which recalculating does not.

6. 1000 / 32 and the remainder rule REASONING

Answer: **31 remainder 8 — and a remainder cannot be 32 or more, because if 32 are left then another whole group of 32 fits and the quotient should have been one bigger**

1. 32 into 100 is 3 (96), leaving 4. Bring down the 0: 32 into 40 is 1, leaving 8. So 31 r 8.
2. Check: $32 \times 31 + 8 = 1000$.
3. If the remainder were 40, another 32 would fit inside it, so the quotient was too small by at least one.
4. So “remainder smaller than the divisor” is not an extra rule to remember — it is what finishing the division means.

If wrong: Gave the rule as “the remainder has to be less than the divisor” without the reason. The reason is what makes it a CHECK: a remainder of 40 tells you another group fits, which locates the error rather than just flagging it.

7. 482 seats in rows of 24 APPLICATION

Answer: **20 full rows, with 2 seats left over — the remainder is 2 seats that do not fill a row**

1. $482 \div 24$: 24 into 48 is 2, leaving 0. Bring down the 2: 24 into 2 is 0.
2. So 20 remainder 2. Check: $24 \times 20 + 2 = 482$.
3. 20 full rows.
4. The remainder is 2 seats, which is a real quantity of seats and not part of a row — so if everyone must be seated, a 21st row is needed for those 2.

If wrong: Answered 2 rows, dropping the zero, or 20.2 rows. There is no such thing as 0.2 of a row here, and interpreting the remainder in context is the “Multistep problems and remainders” sheet (Grade 4) skill being reused.

8. 500 / 24 as a decimal APPLICATION

Answer: **20.83**

1. $500 \div 24 = 20$ remainder 20.
2. The remainder is 20 out of 24, so the fractional part is 20/24.
3. $20 \div 24 = 0.8333\ldots$
4. So the answer is 20.83 to two places. Note it is nowhere near 20.20.

If wrong: Wrote 20.20, moving the remainder after the point unchanged. The remainder has to be DIVIDED by the divisor first, and 20/24 is 0.83, not 0.20.

9. Why multiplying back matters more now REASONING

Answer: **because a two-digit divisor is not in the times tables, so every quotient digit is a guess — and a guess needs testing, while a times-table fact does not**

1. With a one-digit divisor, “how many 7s in 45” is a recalled fact, and a child is either right or has misremembered.
2. With 33, “how many 33s in 181” has to be estimated and tried.
3. So the working now contains guesses, and multiplying is how a guess is tested — too big means try one fewer, too small means the remainder will give it away.
4. That is why the standard names the relationship between multiplication and division as part of the method rather than as a check afterwards.

If wrong: Said “because the numbers are bigger, so it is easier to make a mistake”. Bigger numbers are part of it; the specific change is that the quotient digits stop being recalled facts and become guesses, and a method built on guesses needs a test built into it.

Quick answers for fast checking:

#	Level	Answer
1	fluency	estimate 25; 23; $42 \times 23 = 966$
2	fluency	estimate about 250; 255
3	fluency	estimate 50; 50
4	fluency	estimate about 290; 289
5	reasoning	estimate 50; 5 is ten times too small
6	reasoning	31 r 8; 32 left means another group fits
7	application	20 rows, 2 seats over
8	application	20.83, from $20 \div 24$
9	reasoning	every quotient digit is a guess, and guesses need testing

Lesson slides — teaching notes & timing

Mini-lesson slides, then the practice worksheet. Slide numbers match the deck.

Slide	~Time	Note
1/8	0:00	This is the “Dividing with remainders” sheet (Grade 4) with a divisor that no longer fits the times tables, and that is the real change: every quotient digit is now a GUESS. So multiplying back stops being good practice and becomes part of the method — which is how the standard itself words it.
2/8	0:35	Estimate before any digits. Then say the useful extra thing: about 200 tells you the answer has THREE digits, so an answer with two is already known to be wrong before it is checked.
3/8	1:15	

		THE slide. Work to the 7 and stop there. Ask how many 24s are in 7 and wait for “none”. Then say: none is a number, and it needs writing down. This is the same claim as the interior zero in the “Multiplying multi-digit numbers” sheet (Grade 5).
4/8	2:10	Complete it and read the digits off in order — 2, 0, 3 — one per step, including the step whose answer was none.
5/8	2:50	The dropped-zero answer, judged against the estimate rather than the correct answer. 23 against about 200 is a size error, not a digit error, and children find size errors much easier to spot.
6/8	3:40	Multiply back on both. The point worth making: $24 \times 23 = 552$ does not just say “wrong”, it says roughly how wrong — 552 is between an eighth and a ninth of 4872, so the quotient is nearly nine times short. Note it is not exactly ten times: an interior zero costs a factor of 8.8 here, while a TRAILING zero ($2050 \div 41 = 50$ read as 5) costs exactly ten. That difference tells you where the zero went missing.
7/8	4:45	Remainders, and both errors. The too-large remainder is the one a child can catch unaided, so it should never appear on paper. Then $20 \text{ r } 20$ against 20.20: the remainder is twenty TWENTY-FOURTHS, and putting it after a point claims hundredths.
8/8	6:15	The three divisions include one with a trailing zero ($2050 \div 41 = 50$), which is dropped just as readily as an interior one. Exit ticket after.