Introduction to Inequalities: Weekly Planning for Teachers (Online)

Chapter 9, Introduction to Inequalities · November 2026 · draft for review · all three weeks written

How the chapter runs

This plan covers Chapter 9, Introduction to Inequalities, taught online after Chapter 8: 13-year-olds with five maths lessons a week of about 55 minutes, each student working on a device in the course pages. It takes 3 weeks (15 lessons): 11 teaching lessons, a mixed practice day, a review day, the chapter check and a buffer lesson at the end.

Until now, one side has always equalled the other. In this chapter one side is bigger. Inequalities follow almost the same rules as equations, with one surprise: multiplying or dividing by a negative number flips the sign. Students read and write inequalities and interval notation; learn what adding, multiplying, powers, roots and reciprocals do to them; compare numbers without a calculator; solve linear inequalities and chains; turn word problems into inequalities; graph inequalities in x and y as half-planes and regions; and find largest and smallest values with a limit and an example. Linear programming, in the book's last section, is left out. All units are metric, and money is in euros.

Every day is a normal lesson. Monday to Friday, each lesson teaches one skill (or half of a harder one) with the same 55-minute plan. When a skill is finished, its mastery check is the last part of that lesson. The page marks the check straight away.

Below the pass mark is "not yet", never a fail. The student practises that skill again, then retakes the check with new questions at the end of a later lesson. The mixed days and the buffer lesson have time for retakes built in.

Two routes. The mandatory route is 11 skills for every student; the chapter is mastered when all of them are. The advanced route has four optional skills (roots inside roots and other roots, powers too big to rewrite, either but not both, and letters in a denominator or a percent), proposed and still to be written.

Week	Focus	Lessons
1	The rules of inequalities	IN01, IN02, IN03, IN04, IN05
2	Solving inequalities	IN06, IN07, MX19, IN08, IN09
3	Regions, largest and smallest, review and the chapter check	IN10, IN11, MX20, CH9, BUF9

Numbering. Skills are numbered IN01 to IN15 (inequalities); GL stays Chapter 8, PR Chapter 7, RP Chapter 6, SY Chapter 5, MV Chapter 4 and LE Chapter 3. Mixed practice and review days are numbered MX19 and MX20, after Chapter 8's MX17 and MX18: they practise several skills at once and have no mastery check of their own, so they are not skills. CH9 is the chapter check and BUF9 the buffer lesson. Warm-up questions are numbered 801 and up, practice-set exercises 301 and up.

Answers. Some answers are drawn: on a number line students tap the boundary number (tap again to close the circle) and shade left, right or between; on a grid they tap two points for each boundary line, make it solid or dashed, and tap a point on the side to shade. Others are typed: a number, an inequality or chain (x > -1, -2 <= n < 7, with ≤, ≥ and ∞ keys under the box), an interval ((-1, +∞), [-2, 1]), "no solution", a point (3, 2) and an inequality in x and y (2x + 3y <= 7). Any answer with the same solution set is right. Wrong answers that match a common mistake are named: the sign not flipped after dividing by a negative number, flipped when it shouldn't be, an end included or left out, half of a chain, the wrong side shaded, a solid line where a dashed one belongs.

Metric units only. Where units appear they are metric: the pool problem is in litres and the flour-and-sugar problem in kilograms, with the book's numbers. Money is in euros, as in the earlier chapters. Real people in the book's problems are replaced by invented names.

What you do

- In each lesson: lead the Learn part with the class, then walk round while students practise. There is nothing to prepare, print or mark.
- After each lesson, five minutes in the class view: who is “not yet” on today’s check, and the mistakes each student makes most often (see The class view after each lesson).
- Use what you see there in the next lesson’s warm-up.

A normal lesson

Every lesson, Monday to Friday, follows the same four parts, so students know what to expect and you never plan from scratch.

Minutes	Part	Students	You
0 to 8	Warm-up	Answer one or two quick questions on earlier skills, in the page	Read the answers out in a minute. Add the mistake the class view showed most often yesterday, if there was one
8 to 20	Learn	Open the day’s lesson and follow it together: the narrated video (a minute or two), the explanation, and the activity (step-by-step problems: which rule, keep or flip the sign, which side to shade)	Lead it from the front on your own screen. Ask “does it flip, and why?” and “which number could you test?” more than “what is the answer?”
20 to 45	Practise	Work through the practice, easiest first. Each answer gets instant feedback that names the mistake. Hints are there when stuck. Students who finish early do the two extra exercises	Walk round. Look for the mistakes listed in the day’s plan and stop the class if you see one several times
45 to 55	Exit	If the skill finishes today: its mastery check (about 10 minutes), plus any retakes. Otherwise: redo, without hints, the hardest practice question they got right	Make sure everyone submits before the bell. The page marks the checks and gives every student different questions

A student who finishes the practice early may take the mastery check before the Exit.

Mastery checks and retakes

1. **Check at the end of the skill.** On the day a skill finishes, its mastery check takes the last 10 minutes of the lesson. The page builds a new set of questions for every student and every attempt, so there is nothing to copy.
2. **The page marks it.** Students see their score, which rows they missed and why, straight away. A row counts only when it is exactly right and finished. The result appears in the class view at the same moment.
3. **Below the pass mark: “not yet”.** The student practises that skill again (the lesson’s practice and its extra exercises), then retakes the check at the end of a later lesson, with new questions. The mixed practice and review days (Wednesday of weeks 2 and 3) end with retakes, and in week 3 every check of the chapter can be retaken on the week 3 page.
4. **The chapter check has no pass mark.** On Thursday of week 3 it shows, skill by skill, what each student still knows. Every skill a student misses goes on their review list for Friday’s buffer lesson.

Some students cannot get online at home. Let them practise and retake in a lunchtime or after-school session on the school’s devices.

The three weeks

Week 1: The rules of inequalities

Monday students read and write inequalities: the sign points to the smaller number, chains with the smaller number first, the number line (open and closed circles) and interval notation. Tuesday they add and subtract: the same change on both sides keeps the order, and two inequalities that point the same way can be added but never subtracted. Wednesday is the key rule: multiplying or dividing by a negative number flips the sign, and a letter of unknown sign means you can't tell. Thursday is powers, roots and reciprocals, safe only when both sides are positive; reciprocals flip, and a square is never negative. Friday compares numbers without a calculator: cross-multiplying fractions, squaring roots, and giving big powers the same exponent.

Day	Lesson	Warm-up	Exit	Watch for
Mon	IN01 Read and write inequalities "Bigger or Smaller?"	number line (PRE07, earlier work); signed-number arithmetic (PRE01, earlier work)	IN01 check (5 of 6)	Reading the sign the wrong way round: 5 < 9 read as "5 is greater than 9". Mixing up strict and nonstrict: thinking x > 7 includes 7, or writing "at least 3" as x > 3
Tue	IN02 Add and subtract "Same Change, Same Order"	IN01	IN02 check (4 of 5)	Thinking that subtracting a number, or adding a negative one, reverses the sign. Adding two inequalities that point opposite ways
Wed	IN03 Multiply and divide: a negative flips the sign "Flip the Sign"	IN02; signed-number arithmetic (PRE01, earlier work)	IN03 check (5 of 6)	Not reversing the sign when multiplying or dividing by a negative number: −3x > 6, so x > −2. Reversing the sign because a number in the inequality is negative, not because of what you divide by: 2x < −6, so x > −3
Thu	IN04 Powers, roots and reciprocals of positive numbers "When Both Sides Are Positive"	IN03; squares, cubes & square roots (PRE13, earlier work); negative exponents (EX07, Chapter 2)	IN04 check (4 of 5)	Squaring both sides when one of them can be negative: 2 > −3, so 4 > 9. Taking reciprocals without reversing the sign: 7 > 5, so 1/7 > 1/5
Fri	IN05 Which is greater? Fractions, roots and big powers "Which Is Greater?"	IN04; multiply powers of the same base (EX04, Chapter 2)	IN05 check (4 of 5)	Cross-multiplying the wrong pairs (a × c against b × d). Comparing fractions by their numerators or denominators alone, or thinking 13/17 and 17/21 are equal because both are 4 short of 1

Week 2: Solving inequalities

Solving a linear inequality on Monday (like an equation, flipping only when dividing by a negative number, with the answer as an inequality, an interval or on the number line), chains and inequalities in √x or x^2 on Tuesday (all three parts, or split the chain; sometimes there is no solution), mixed practice on Wednesday (which rule: keep, flip, square, split or cross-multiply?), word problems on Thursday (at least, at most, more than; round the right way and answer the question asked) and graphing an inequality in x and y on Friday (the boundary line, solid or dashed, then test a point).

Day	Lesson	Warm-up	Exit	Watch for
Mon	IN06 Solve a linear inequality “Solve It”	solve any linear equation (LE13, Chapter 3); IN03	IN06 check (5 of 6)	Not reversing the sign when dividing by a negative coefficient: $-8t < 8$, so $t < -1$. Reversing the sign when a term moves to the other side
Tue	IN07 Inequality chains, and √x or x^2 in place of x “Chains and Disguises”	IN06; IN04	IN07 check (4 of 5)	Doing a step to only two of the three parts of a chain. Treating a chain with the letter in more than one part as one inequality
Wed	MX19 Which rule? Mixed practice (IN01 to IN07: reading, the rules, which is greater, solving and chains). Keep the sign, flip it, square, split the chain, or cross-multiply? Before each task, name the rule it needs “Which Rule?”	IN03; IN04; IN01	Hardest practice question; retakes	Using a rule where it doesn’t apply when the task doesn’t name it: flipping after adding, squaring when a side can be negative
Thu	IN08 Word problems: at least, at most, more than “At Least, At Most”	build the equation (LE19, Chapter 3); the percent equation (RP14, Chapter 6)	IN08 check (3 of 4)	Writing “at least” as > or “at most” as <, or “more than” as ≥. Rounding a whole-number answer the wrong way: $n \geq 7.8$, so 7 bottles; $n \leq 12.06$, so 13 books
Fri	IN09 Graph an inequality in the plane “Half the Plane”	intercepts and slope-intercept form (GL09, an earlier chapter); IN06	IN09 check (4 of 5)	A solid line for a strict inequality, or a dashed line for ≤ or ≥. Shading by the sign alone (> means up or right) when the inequality is not solved for y, or after dividing by a negative number without reversing

Week 3: Regions, largest and smallest, review and the chapter check

Regions where several inequalities hold on Monday (the overlap of the half-planes, each line solid or dashed by its own sign, corners found by solving), the largest or smallest value on Tuesday (a limit from an inequality, then an example that reaches it), a review of the whole chapter on Wednesday, the chapter check on Thursday and the buffer lesson on Friday.

Day	Lesson	Warm-up	Exit	Watch for
Mon	IN10 Regions from several inequalities “Where Both Hold”	IN09; two lines on one graph (GL10, an earlier chapter)	IN10 check (3 of 4)	Shading where either inequality holds instead of where both do. Making every boundary solid, or every one dashed, when the signs are mixed

Day	Lesson	Warm-up	Exit	Watch for
Tue	IN11 Largest and smallest: a limit, then an example “As Large As Possible”	IN08; IN05	IN11 check (3 of 4)	Stopping at the inequality ($d \leq 29$) without showing that 29 can be reached. Giving a value that can’t be reached: a bound that is not a whole number, or the boundary of a strict inequality
Wed	MX20 Chapter review (IN01 to IN11: every skill of the chapter). A review of the whole chapter in no particular order, like tomorrow’s chapter check “Which Skill? Chapter Review”	IN03; IN07; IN09	Hardest practice question; retakes	Doing well when the skill is announced, but stalling or guessing when it is not
Thu	CH9 Chapter check: one or two questions from every mandatory skill, mixed (whole lesson)	None	None: the check is the whole lesson	Shows what each student still knows weeks later, skill by skill; it makes each student’s review list for Friday
Fri	BUF9 Buffer lesson: warm-up, your review list from the chapter check, retakes	IN03; IN07; IN10	Retakes	Teach again any skill where many students missed the chapter check; then review lists and retakes

The lesson videos

Each teaching lesson opens its Learn part with a short narrated video; 11 videos in all. Every video has captions, a storyboard (one picture for each step, to print for students) and a teacher script (what to say and write on the board), so a class without screens can follow the same lesson. All of them are in Lesson videos on the course home.

Video	Title	Lesson	Length
IN01-V1	Bigger or Smaller?	Monday, week 1: Bigger or Smaller?	1:32
IN02-V1	Same Change, Same Order	Tuesday, week 1: Same Change, Same Order	1:16
IN03-V1	Flip the Sign	Wednesday, week 1: Flip the Sign	1:20
IN04-V1	When Both Sides Are Positive	Thursday, week 1: When Both Sides Are Positive	1:24
IN05-V1	Which Is Greater?	Friday, week 1: Which Is Greater?	1:42
IN06-V1	Solve It	Monday, week 2: Solve It	1:21
IN07-V1	Chains and Disguises	Tuesday, week 2: Chains and Disguises	1:33
IN08-V1	At Least, At Most	Thursday, week 2: At Least, At Most	1:35
IN09-V1	Half the Plane	Friday, week 2: Half the Plane	1:26
IN10-V1	Where Both Hold	Monday, week 3: Where Both Hold	1:30
IN11-V1	As Large As Possible	Tuesday, week 3: As Large As Possible	1:57

The class view after each lesson

This replaces marking. Five minutes after each lesson, open the class view at the bottom of the week’s page. It is shown to teachers who can edit the course, and lists every student’s progress, lesson by lesson, live.

Look at	What it tells you	What to do
Who is “not yet” on today’s check	Who needs to practise that skill again and retake	Next lesson, check that their retake happened
How many are “not yet”	Whether the skill landed	Half the class or more: teach it again the next day (see If the class is behind or ahead)
“Watch for”: each student’s most frequent mistakes	What the class misunderstood, by the mistake behind it	Put one question on it in the next warm-up
Last active, and students two or more lessons behind	Who is falling away from the class	Pair them with a classmate during practice

If the class is behind or ahead

Let the check results decide, not the calendar.

Behind. If half the class or more is “not yet” on a skill, teach it again the next day before moving on, and shift the plan by a day. The buffer lesson in week 3 absorbs one day of delay; beyond that, shorten the chapter review (MX20) to half a lesson and keep the chapter check. The mastery checks never get cut. A student stuck on solving (IN06) usually needs multiplying and dividing again (IN03): flip only for a negative number. One stuck on regions (IN10) needs a single half-plane again (IN09): solid or dashed, then test a point.

Ahead. If most students pass first time, use the buffer lesson for the advanced skills. A class that is clearly fast can run a mixed practice day as half a lesson.

Individual students. Nobody waits for the class and nobody is dragged along with it. A student who is behind practises and retakes with new questions; one who is ahead does the extra exercises and, when they are written, the advanced skills. If a student is two or more lessons behind, pair them with a classmate during practice.

Materials status for the pilot

This plan describes the full chapter online. All content is a draft waiting for review by the maths expert.

Material	Status
Skill graph for the chapter, with the mandatory and advanced routes	Ready
Week 1 to week 3 pages: 15 lessons (IN01, IN02, IN03, IN04, IN05, IN06, IN07, MX19, IN08, IN09, IN10, IN11, MX20, CH9, BUF9), each with warm-up, lesson, practice and its mastery check or exit question, and a class view	Ready (prototype)
11 lesson videos, one for each teaching lesson (the mixed practice and review days have none), each with captions, a storyboard and a teacher script	Ready (draft)
Practice sets: 32 more exercises for the four hardest skills (multiplying and dividing, chains, word problems, regions), and five exercise exemplars	Ready (draft)
Advanced skills IN12 to IN15	Proposed, not written yet
Catch-up practice set automatically as homework, with the retake opening once it is done	Designed, not built yet
Sign-in for a whole class through the school	Part of the production platform