

TEACHER AND STUDENT RESOURCE

Linear Equations and Inequalities



NC Math 1 • NC.M1.A-REI.3

Equations, inequalities and mathematical reasoning

Seven instructional sections with 30 multiple-choice and 30 open or performance tasks, teaching scripts, original mathematical visuals, generous workspaces, and worked keys.

Free sample | Contents

NC.M1.A-REI.3 | NC Math 1 mathematics

This sample contains 19 complete selected pages from the 92-page resource, plus this sample contents page. Original printed page numbers are retained. Gaps are intentional.

Included original pages: 1-15, 30-31, 60, 75

Representative activities

M01: sample PDF page(s) 16; original page(s) 15

M02: sample PDF page(s) 16; original page(s) 15

O01: sample PDF page(s) 17; original page(s) 30

O02: sample PDF page(s) 18; original page(s) 31

Selected teacher prompts and keys: original page(s) 60, 75

Using this sample

Read the preparation and access guidance before using a selected activity.
Keep teacher keys and private preparation pages separate from student copies.
Use the original resource contents to see the scope of the complete packet.

Complete paid download

The complete resource includes the full PDF task bank and teaching materials.

ALIGNMENT

Standard and learning targets

Solve linear equations and inequalities in one variable.

T1 Solve one-variable linear equations.

T2 Solve and represent linear inequalities.

T3 Interpret identities, contradictions and contextual domains.

Each item names its own target. The bank supports multiple sessions; do not assign all 60 tasks in one sitting.

NAVIGATION

Choose evidence deliberately

Warm-up: M01-M04 and O01-O04

I Do: M05-M08 and O05-O08

We Do: M09-M13 and O09-O13

Collaborative practice: M14-M18 and O14-O18

Independent practice: M19-M23 and O19-O23

Small-group reteach: M24-M27 and O24-O27

Exit ticket: M28-M30 and O28-O30

T1: M01, O01, M02, O02, M07, O07, M10, O10, M11, O11, M12, O12, M17, O17, M20, O20, M21, O21, M22, O22, M27, O27, M30, O30

T2: M03, O03, M04, O04, M08, O08, M09, O09, M13, O13, M14, O14, M18, O18, M19, O19, M23, O23, M24, O24, M28, O28, M29, O29

T3: M05, O05, M06, O06, M15, O15, M16, O16, M25, O25, M26, O26

PLANNING

Materials, access and pacing

Materials

Pencils, erasers, straightedge, student pages, and optional graph paper. A calculator may support arithmetic after a learner states the intended relationship. No device or paid software is required.

Prerequisites

Signed-number arithmetic, distributive property, substitution, products and square roots. Diagnose these separately before scoring the targeted reasoning.

Pacing

Use a short diagnostic warm-up, a model and shared task in one session; collaborative and independent reasoning in later sessions; then targeted reteaching and an exit task. Select two to four tasks at a time based on evidence. Each section's full bank is reusable, not mandatory in one lesson.

Neutral access

Read directions aloud without interpreting the graph, enlarge a page, supply a writing or pointing response method, and allow a learner to dictate an explanation. Keep axes, units, data and mathematical demand unchanged.

Separate instruction from evidence

Keep the learner's first response. Record answer-supplying cues separately from access supports. A completed teacher graph or worked key is for discussion after independent work, never a student construction template.

Review convention

Use real-number domains unless a context restricts them. Equality permits reversible operations; inequalities reverse when multiplied or divided by a negative number.

TEACHER MODEL

Order reverses under a negative scale

Solve $-3x + 4 \leq 16$ and represent the set.

Subtract 4 on both sides: $-3x \leq 12$. Divide by -3: $x \geq -4$. Multiplication by a negative reflects order on the real number line, so $\leq$ becomes $\geq$. A closed endpoint at -4 and a ray right represent the set. Check -4 gives 16; 0 gives 4; -5 gives 19 and fails.

VISUAL ANCHOR

Track the complete solution set

Model: $-3x + 4 \leq 16$ gives $x \geq -4$.



Closed dot: the boundary -4 is included.

Ray right: all real values greater than -4 work.

Check: -4 gives equality; 0 works; -5 fails.

A negative scale reflects order, so the inequality reverses.

REUSABLE REASONING GUIDE

Represent, justify, interpret

Name: _____ Date: _____

Givens, quantities and restrictions**Representation and calculation****Justification or check****Conclusion, domain and units**

WARM-UP

Teaching script

Core: 001 • T1: Solve one-variable linear equations.

Optional bank: M01–M04; O01–O04. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 5–8 minutes. Adjust for access and evidence; this is not a speed criterion.

Display student page O01, including its graph when present. Invite a first independent response before discussion. Ask, “What do the symbols represent? What evidence supports your claim?”

Core task

Solve $2(x - 3) = 10$. Explain the inverse operations and check.

Teacher solution and discussion

Divide both sides by 2, giving $x - 3 = 5$; add 3, giving $x = 8$. Check: $2((8)-3) = 10$.

Evidence and response

Look for a claim tied to specific terms, factors, operations or graph features. If a learner only names an answer, ask which values or parts of the graph support it. If a sign or operation is mishandled, reconstruct that step with a numerical analogy, then collect a fresh response. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M01 to compare all alternatives after evidence is collected.

I DO

Teaching script

Core: 005 • T3: Interpret identities, contradictions and contextual domains.

Optional bank: M05–M08; 005–008. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 10–12 minutes. Adjust for access and evidence; this is not a speed criterion.

Display student page 005, including its graph when present. Think aloud through the core task. Say, “I will identify the quantities first, then build a representation and check it against the stated domain.” Hide the worked key until after predictions.

Core task

Solve $2(x - 5) = 2x - 10$. Justify your solution set without listing individual values.

Teacher solution and discussion

Distributing makes both sides $2x - 10$; subtracting leaves $0=0$. Every real x satisfies this identity.

Evidence and response

Look for a claim tied to specific terms, factors, operations or graph features. If a learner only names an answer, ask which values or parts of the graph support it. If a sign or operation is mishandled, reconstruct that step with a numerical analogy, then collect a fresh response. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M05 to compare all alternatives after evidence is collected.

WE DO

Teaching script

Core: 009 • T2: Solve and represent linear inequalities.

Optional bank: M09–M13; O09–O13. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 10–15 minutes. Adjust for access and evidence; this is not a speed criterion.

Display student page O09, including its graph when present. Have learners propose the next step, then ask a partner to verify it using the original representation. Record more than one valid explanation.

Core task

A rental has a \$5 fee plus \$2 per hour. You can spend at most \$11. Model and solve for real hours $h \geq 0$; interpret the endpoint.

Teacher solution and discussion

$5 + 2h \leq 11$ and $h \geq 0$ give $0 \leq h \leq 3$. At 3 hours the entire budget is used. Hours greater than 3 exceed it.

Evidence and response

Look for a claim tied to specific terms, factors, operations or graph features. If a learner only names an answer, ask which values or parts of the graph support it. If a sign or operation is mishandled, reconstruct that step with a numerical analogy, then collect a fresh response. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M09 to compare all alternatives after evidence is collected.

COLLABORATIVE PRACTICE

Teaching script

Core: O14 • T2: Solve and represent linear inequalities.

Optional bank: M14–M18; O14–O18. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 15–20 minutes. Adjust for access and evidence; this is not a speed criterion.

Display student page O14, including its graph when present. Assign reader, representer, checker and explainer roles. Each learner first makes a private prediction; compare reasoning and resolve differences with the data.

Core task

Solve $3x - 6 > 9$. Graph and check the boundary.

Teacher solution and discussion

Add 6, then divide by 3: $x > 5$. Open dot at 5, ray right. Boundary produces equality and is excluded; 6 satisfies the strict inequality.

Evidence and response

Look for a claim tied to specific terms, factors, operations or graph features. If a learner only names an answer, ask which values or parts of the graph support it. If a sign or operation is mishandled, reconstruct that step with a numerical analogy, then collect a fresh response. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M14 to compare all alternatives after evidence is collected.

INDEPENDENT PRACTICE

Teaching script

Core: 019 • T2: Solve and represent linear inequalities.

Optional bank: M19–M23; O19–O23. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 15–20 minutes. Adjust for access and evidence; this is not a speed criterion.

Display student page O19, including its graph when present. Provide the printed task and neutral access supports. Preserve the first independent response; do not point to the requested answer or select a method for the learner.

Core task

A rental has a \$6 fee plus \$3 per hour. You can spend at most \$21. Model and solve for real hours $h \geq 0$; interpret the endpoint.

Teacher solution and discussion

$6 + 3h \leq 21$ and $h \geq 0$ give $0 \leq h \leq 5$. At 5 hours the entire budget is used. Hours greater than 5 exceed it.

Evidence and response

Look for a claim tied to specific terms, factors, operations or graph features. If a learner only names an answer, ask which values or parts of the graph support it. If a sign or operation is mishandled, reconstruct that step with a numerical analogy, then collect a fresh response. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M19 to compare all alternatives after evidence is collected.

SMALL-GROUP RETEACH

Teaching script

Core: O24 • T2: Solve and represent linear inequalities.

Optional bank: M24–M27; O24–O27. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 10–15 minutes. Adjust for access and evidence; this is not a speed criterion.

Display student page O24, including its graph when present. Start with the learner's prior evidence. Rebuild one representation with explicit terms and operations, then use a fresh item to check transfer without the prior cue.

Core task

Solve $4x - 7 > 21$. Graph and check the boundary.

Teacher solution and discussion

Add 7, then divide by 4: $x > 7$. Open dot at 7, ray right. Boundary produces equality and is excluded; 8 satisfies the strict inequality.

Evidence and response

Look for a claim tied to specific terms, factors, operations or graph features. If a learner only names an answer, ask which values or parts of the graph support it. If a sign or operation is mishandled, reconstruct that step with a numerical analogy, then collect a fresh response. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M24 to compare all alternatives after evidence is collected.

EXIT TICKET

Teaching script

Core: O28 • T2: Solve and represent linear inequalities.

Optional bank: M28–M30; O28–O30. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 5–8 minutes. Adjust for access and evidence; this is not a speed criterion.

Display student page O28, including its graph when present. Ask for a concise claim supported by the representation. Collect the response before sharing a solution; use it to choose the next instructional step.

Core task

Solve $4(x - 7) < 4x - 29$. Explain whether any real value works.

Teacher solution and discussion

Subtract $4x$ after distribution: $-28 < -29$, false. No real values work.

Evidence and response

Look for a claim tied to specific terms, factors, operations or graph features. If a learner only names an answer, ask which values or parts of the graph support it. If a sign or operation is mishandled, reconstruct that step with a numerical analogy, then collect a fresh response. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M28 to compare all alternatives after evidence is collected.

MULTIPLE-CHOICE BANK

M01 / M02 • Select and justify**M01 | Warm-up | T1****Solve $2x + 3 = 13$.**

- A. $x = -5$
- B. $x = 10$
- C. $x = 5$
- D. $x = 6$

Reasoning: _____

M02 | Warm-up | T1**Solve $2(x + 3) = 1x + 11$.**

- A. $x = 11$
- B. $x = 2.5$
- C. $x = 5$
- D. $x = -5$

Reasoning: _____

WARM-UP

001 • Show your reasoning**T1: Solve one-variable linear equations.****Solve $2(x - 3) = 10$. Explain the inverse operations and check.****Representation / calculation****Explanation / check**

WARM-UP

002 • Show your reasoning**T1: Solve one-variable linear equations.****Solve $2(x + 5) = 1x + 13$. Show distribution and collect like terms.****Representation / calculation****Explanation / check**

WORKED TEACHER KEYS

M01 / M02**M01 • T1: Solve one-variable linear equations.****Answer: C. $x = 5$**

Subtract 3: $2x = 10$; divide by nonzero 2: $x = 5$. Substitution gives 13 on both sides.

Check each alternative

- A. A sign change is not justified by subtracting the constant.
- B. This is the value of the entire variable term, before division.
- C. Subtract 3: $2x = 10$; divide by nonzero 2: $x = 5$. Substitution gives 13 on both sides.
- D. The extra 1 does not satisfy the original equality.

M02 • T1: Solve one-variable linear equations.**Answer: C. $x = 5$**

Distribute: $2x+6=(1)x+11$. Subtract $(1)x$ and 6: $x=5$.

Check each alternative

- A. This leaves the distributed constant on the wrong side.
- B. The remaining coefficient is 1, not the original coefficient.
- C. Distribute: $2x+6=(1)x+11$. Subtract $(1)x$ and 6: $x=5$.
- D. This reverses the difference of the constants.

WORKED TEACHER KEYS

001 / 002**001 • T1: Solve one-variable linear equations.**

Divide both sides by 2, giving $x - 3 = 5$; add 3, giving $x = 8$. Check: $2((8)-3) = 10$.

002 • T1: Solve one-variable linear equations.

$2x+10=(1)x+13$. Subtract $(1)x$ and 10, yielding $x=3$. Both sides equal 16 at this value.