

# Products, Quotients and Decimals



## Grade 7 | NC.7.NS.2

### The Number System

Teacher scripts, original models and student organizers

30 multiple-choice + 30 open/performance tasks

Worked keys, scoring and individual evidence records

Current NC standards for 2026-27 and 2027-28. Select tasks across several sessions. This resource bank is not one test.

# Free sample | Contents

NC.7.NS.2 | Seventh Grade 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.

## TEACHER GUIDE

# Exact standard and scope

## Apply and extend previous understandings of multiplication and division.

- a. Understand that a rational number is any number that can be written as a quotient of integers with a non-zero divisor.
- b. Apply properties of operations as strategies, including the standard algorithms, to multiply and divide rational numbers and describe the product and quotient in real-world contexts.
- c. Use division and previous understandings of fractions and decimals.

Convert a fraction to a decimal using long division.

Understand that the decimal form of a rational number terminates or eventually repeats.

Domain: THE NUMBER SYSTEM

Cluster: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Current NC wording and numbering are retained. Adopted 2026 revisions beginning in 2028-29 are not substituted.

## TEACHER GUIDE

# Targets and evidence

## **Multiply rational numbers with signed fraction algorithms.**

Evidence: M06, M09, M10, M24, M26, O01, O04, O05, O08, O11

## **Divide signed rational numbers and verify with multiplication.**

Evidence: M03, M14, M19, M21, M22, O12, O14, O17, O19, O20

## **Represent a rational number as a quotient of integers with nonzero divisor.**

Evidence: M01, M20, M25, M28, M29, O07, O10, O13, O21, O25

## **Convert fractions by long division and explain terminating or repeating decimals.**

Evidence: M04, M07, M16, M18, M30, O06, O15, O16, O18, O29

## **Interpret a signed rational product as a contextual change.**

Evidence: M02, M08, M12, M13, M23, O02, O09, O22, O23, O26

## **Use distribution to multiply rational numbers in two equivalent ways.**

Evidence: M05, M11, M15, M17, M27, O03, O24, O27, O28, O30

MP2: connect quantities and symbols. MP3: justify claims. MP4: model a context. MP6: attend to signs, units and precision. Open tasks require actual calculations and explanations.

## TEACHER GUIDE

# Plan and navigation

Use four sessions of about 25-35 minutes: warm-up/model; shared/partner work; independent work; reteach/exit. Choose one M and one O item from each section first. The rest is a reusable bank for spaced practice and conferences. Do not assign all 60 items in one sitting.

**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**

Navigation: standard and targets; planning/access; worked model; organizer; seven scripts; choice pages; open tasks; worked keys; rubric; record; sources. Print only selected student pages. Teacher models and keys stay separate from independent work.

## TEACHER GUIDE

# Preparation and access

Prerequisites: equivalent fractions, decimal place value, integer direction, multiplication/division facts and operation order. Check prerequisites with a neutral example before teaching the selected target.

Materials: pencil, ruler, supplied blank lines and organizers; optional signed paper counters. Adults handle cutting. A fraction bar means numerator divided by denominator; a slash between parenthesized quantities is division. Brackets in decimal answers mark the repeating block.

Access: neutral read-aloud, enlarged print, high contrast, AAC/signing and dictated explanations. A scribe records student-directed steps exactly. Do not score handwriting, decoding or accent. Calculator exploration can follow the first unaided calculation; record tool use separately when it changes the evidence.

Answer-supplying cues include telling the learner which operation to use, changing a sign for them, supplying a reciprocal or marking the answer on the line. Preserve the first response and record any later supported response separately.

Differentiation: begin with halves/quarters and relate signs to direction; then vary denominators. Extend by comparing valid strategies, finding an input for which a shortcut fails, or creating a context for an expression. Do not replace the required performance with choice recognition.

N/O means unobserved, inaccessible or insufficient evidence. Zero is for an observed interpretable incorrect response. No invented speed cutoff or official mastery threshold is used. All contexts and numerical data are invented for instruction.

## WORKED TEACHER MODEL

## Think aloud and connect

Say: " $(-3/4) \times (-2/3) = 6/12 = 1/2$ . To see why two negatives give a positive, distribute  $(-3/4)$  over  $2/3 + (-2/3) = 0$ : the two products must be opposites. For  $(-3/4) / (2/3)$ , multiply by  $3/2$  to get  $-9/8$ . Check  $(-9/8) \times (2/3) = -3/4$ . The divisor cannot be zero." Model  $3/8$  by long division:  $30 = 8 \times 3 + 6$ ;  $60 = 8 \times 7 + 4$ ;  $40 = 8 \times 5 + 0$ , so  $0.375$  terminates. For  $1/3$ ,  $10 = 3 \times 3 + 1$ ; the remainder 1 returns, producing  $0.[3]$ .

**Anchor: rational = integer / nonzero integer. Multiply: numerators together, denominators together. Divide: multiply by the nonzero divisor's reciprocal. Decimal division stops at remainder 0 or repeats once a remainder repeats.**

**Teacher check:  $0 / 5 = 0$ ;  $5 / 0$  is undefined;  $0 / 0$  is undefined.**

## REPRODUCIBLE STUDENT TOOL

# Reasoning organizer

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Item: \_\_\_\_\_

**Given quantities and units / what must be found****Expression / useful representation or long division****Ordered steps / answer with units****Check / why the result makes sense**

## TEACHER GUIDE

# Warm-up teaching script

Select M01 and O01 first; use the remaining items through 04 later. Target: Multiply rational numbers with signed fraction algorithms.

## Launch | 2-3 minutes

Say: "Read the quantities with their signs. What is being asked? Which unit or reference gives the signs meaning?" Let the learner restate the task without supplying an operation.

## Model or elicit | 5-8 minutes

Say: "Write the expression before calculating. Show each equivalent step. What would let someone check your answer?" For shared work invite one step at a time; for independent/exit work do not supply steps.

## Listen and probe | 3-5 minutes

Look for: Multiply rational numbers with signed fraction algorithms. Ask: "Which property or inverse makes this step valid?" If fractions are involved, check the common denominator or reciprocal explicitly. Keep signed change distinct from distance.

## Respond | 3-5 minutes

Record the first attempt. For a sign error use a small signed example or zero pairs; for fraction errors use equivalent fractions; for grouping errors box the expression that must be evaluated first. Then retry a fresh item. Reteach is supported practice, not a replacement for the original evidence.

## Close | 1-3 minutes

Have each learner explain one step independently. Partners compare only after both record a solution. Early finishers create and test a related expression or context, then explain which change affects the result. Record accuracy, reasoning, interpretation, access support and answer-supplying cues separately.

## TEACHER GUIDE

# I Do teaching script

Select M05 and O05 first; use the remaining items through 08 later. Target: Multiply rational numbers with signed fraction algorithms.

## Launch | 2-3 minutes

Say: "Read the quantities with their signs. What is being asked? Which unit or reference gives the signs meaning?" Let the learner restate the task without supplying an operation.

## Model or elicit | 5-8 minutes

Use the worked teacher example. Pause after every sign change and ask what justifies it. Demonstrate the calculation, model and check.

## Listen and probe | 3-5 minutes

Look for: Multiply rational numbers with signed fraction algorithms. Ask: "Which property or inverse makes this step valid?" If fractions are involved, check the common denominator or reciprocal explicitly. Keep signed change distinct from distance.

## Respond | 3-5 minutes

Record the first attempt. For a sign error use a small signed example or zero pairs; for fraction errors use equivalent fractions; for grouping errors box the expression that must be evaluated first. Then retry a fresh item. Reteach is supported practice, not a replacement for the original evidence.

## Close | 1-3 minutes

Have each learner explain one step independently. Partners compare only after both record a solution. Early finishers create and test a related expression or context, then explain which change affects the result. Record accuracy, reasoning, interpretation, access support and answer-supplying cues separately.

## TEACHER GUIDE

# We Do teaching script

Select M09 and O09 first; use the remaining items through 13 later. Target: Interpret a signed rational product as a contextual change.

## Launch | 2-3 minutes

Say: "Read the quantities with their signs. What is being asked? Which unit or reference gives the signs meaning?" Let the learner restate the task without supplying an operation.

## Model or elicit | 5-8 minutes

Say: "Write the expression before calculating. Show each equivalent step. What would let someone check your answer?" For shared work invite one step at a time; for independent/exit work do not supply steps.

## Listen and probe | 3-5 minutes

Look for: Interpret a signed rational product as a contextual change. Ask: "Which property or inverse makes this step valid?" If fractions are involved, check the common denominator or reciprocal explicitly. Keep signed change distinct from distance.

## Respond | 3-5 minutes

Record the first attempt. For a sign error use a small signed example or zero pairs; for fraction errors use equivalent fractions; for grouping errors box the expression that must be evaluated first. Then retry a fresh item. Reteach is supported practice, not a replacement for the original evidence.

## Close | 1-3 minutes

Have each learner explain one step independently. Partners compare only after both record a solution. Early finishers create and test a related expression or context, then explain which change affects the result. Record accuracy, reasoning, interpretation, access support and answer-supplying cues separately.

## TEACHER GUIDE

# Collaborative practice teaching script

Select M14 and O14 first; use the remaining items through 18 later. Target: Divide signed rational numbers and verify with multiplication.

## Launch | 2-3 minutes

Say: "Read the quantities with their signs. What is being asked? Which unit or reference gives the signs meaning?" Let the learner restate the task without supplying an operation.

## Model or elicit | 5-8 minutes

Say: "Write the expression before calculating. Show each equivalent step. What would let someone check your answer?" For shared work invite one step at a time; for independent/exit work do not supply steps.

## Listen and probe | 3-5 minutes

Look for: Divide signed rational numbers and verify with multiplication. Ask: "Which property or inverse makes this step valid?" If fractions are involved, check the common denominator or reciprocal explicitly. Keep signed change distinct from distance.

## Respond | 3-5 minutes

Record the first attempt. For a sign error use a small signed example or zero pairs; for fraction errors use equivalent fractions; for grouping errors box the expression that must be evaluated first. Then retry a fresh item. Reteach is supported practice, not a replacement for the original evidence.

## Close | 1-3 minutes

Have each learner explain one step independently. Partners compare only after both record a solution. Early finishers create and test a related expression or context, then explain which change affects the result. Record accuracy, reasoning, interpretation, access support and answer-supplying cues separately.

## TEACHER GUIDE

# Independent practice teaching script

Select M19 and O19 first; use the remaining items through 23 later. Target: Divide signed rational numbers and verify with multiplication.

**Launch | 2-3 minutes**

Say: "Read the quantities with their signs. What is being asked? Which unit or reference gives the signs meaning?" Let the learner restate the task without supplying an operation.

**Model or elicit | 5-8 minutes**

Say: "Write the expression before calculating. Show each equivalent step. What would let someone check your answer?" For shared work invite one step at a time; for independent/exit work do not supply steps.

**Listen and probe | 3-5 minutes**

Look for: Divide signed rational numbers and verify with multiplication. Ask: "Which property or inverse makes this step valid?" If fractions are involved, check the common denominator or reciprocal explicitly. Keep signed change distinct from distance.

**Respond | 3-5 minutes**

Record the first attempt. For a sign error use a small signed example or zero pairs; for fraction errors use equivalent fractions; for grouping errors box the expression that must be evaluated first. Then retry a fresh item. Reteach is supported practice, not a replacement for the original evidence.

**Close | 1-3 minutes**

Have each learner explain one step independently. Partners compare only after both record a solution. Early finishers create and test a related expression or context, then explain which change affects the result. Record accuracy, reasoning, interpretation, access support and answer-supplying cues separately.

## TEACHER GUIDE

# Small-group reteach teaching script

Select M24 and O24 first; use the remaining items through 27 later. Target: Use distribution to multiply rational numbers in two equivalent ways.

## Launch | 2-3 minutes

Say: "Read the quantities with their signs. What is being asked? Which unit or reference gives the signs meaning?" Let the learner restate the task without supplying an operation.

## Model or elicit | 5-8 minutes

Say: "Write the expression before calculating. Show each equivalent step. What would let someone check your answer?" For shared work invite one step at a time; for independent/exit work do not supply steps.

## Listen and probe | 3-5 minutes

Look for: Use distribution to multiply rational numbers in two equivalent ways. Ask: "Which property or inverse makes this step valid?" If fractions are involved, check the common denominator or reciprocal explicitly. Keep signed change distinct from distance.

## Respond | 3-5 minutes

Record the first attempt. For a sign error use a small signed example or zero pairs; for fraction errors use equivalent fractions; for grouping errors box the expression that must be evaluated first. Then retry a fresh item. Reteach is supported practice, not a replacement for the original evidence.

## Close | 1-3 minutes

Have each learner explain one step independently. Partners compare only after both record a solution. Early finishers create and test a related expression or context, then explain which change affects the result. Record accuracy, reasoning, interpretation, access support and answer-supplying cues separately.

## TEACHER GUIDE

# Exit ticket teaching script

Select M28 and O28 first; use the remaining items through 30 later. Target: Use distribution to multiply rational numbers in two equivalent ways.

**Launch | 2-3 minutes**

Say: "Read the quantities with their signs. What is being asked? Which unit or reference gives the signs meaning?" Let the learner restate the task without supplying an operation.

**Model or elicit | 5-8 minutes**

Say: "Write the expression before calculating. Show each equivalent step. What would let someone check your answer?" For shared work invite one step at a time; for independent/exit work do not supply steps.

**Listen and probe | 3-5 minutes**

Look for: Use distribution to multiply rational numbers in two equivalent ways. Ask: "Which property or inverse makes this step valid?" If fractions are involved, check the common denominator or reciprocal explicitly. Keep signed change distinct from distance.

**Respond | 3-5 minutes**

Record the first attempt. For a sign error use a small signed example or zero pairs; for fraction errors use equivalent fractions; for grouping errors box the expression that must be evaluated first. Then retry a fresh item. Reteach is supported practice, not a replacement for the original evidence.

**Close | 1-3 minutes**

Have each learner explain one step independently. Partners compare only after both record a solution. Early finishers create and test a related expression or context, then explain which change affects the result. Record accuracy, reasoning, interpretation, access support and answer-supplying cues separately.

## STUDENT CHOICE

# Choice practice 1-2

**M01 | To write 0 as  $p/12$ , what integer must  $p$  be?**

- A. 6
- B. -3
- C. 2
- D. 0

Reasoning notes: \_\_\_\_\_

**M02 | A level changes by  $5/4$  centimeters per minute for 4 minutes at a constant rate. What is its total signed change?**

- A.  $9/2$
- B. 6
- C. 9
- D. 5

Reasoning notes: \_\_\_\_\_

## STUDENT PERFORMANCE

# 001 | Warm-up

Target: Multiply rational numbers with signed fraction algorithms.

**Compute  $(2/3) \times (-2/3)$ . Show your calculations and explain why the signs and operations fit.**

**Expression and calculations / long division if requested**

**Answer / explanation / check**

## STUDENT PERFORMANCE

# 002 | Warm-up

Target: Interpret a signed rational product as a contextual change.

**A level changes by  $\frac{9}{4}$  centimeters per minute for 3 minutes at a constant rate. What is its total signed change? Write the multiplication and repeated-addition models. Interpret the sign and units. Use the blank line as a model; choose and label a suitable scale, zero, start, moves and endpoint.**



Choose a scale. Label equal intervals, zero and all needed values.

**Expression / calculation / labeled model details**

**Answer / explanation / check**

## TEACHER ONLY

# M worked keys 1-2

**M01: D. 0**

Target: Represent a rational number as a quotient of integers with nonzero divisor.

$p = 0 \times 12 = 0$ , so  $0 = 0/12$ . Both entries are integers and the divisor 12 is nonzero. A quotient with divisor 0 cannot define a rational number.

Option checks: 6: This option differs from the exact result by 6. Ask the learner to locate the first changed sign, operation or arithmetic step; the choice alone does not identify a unique misconception. -3: This option differs from the exact result by -3. Ask the learner to locate the first changed sign, operation or arithmetic step; the choice alone does not identify a unique misconception. 2: This option differs from the exact result by 2. Ask the learner to locate the first changed sign, operation or arithmetic step; the choice alone does not identify a unique misconception.

**M02: D. 5 centimeters**

Target: Interpret a signed rational product as a contextual change.

4 minutes  $\times$  (5/4 centimeters/minute) = 5 centimeters. The level rises. Repeated sum:  $(5/4) + (5/4) + (5/4) + (5/4) = 5$ . Start at 0 and draw 4 equal moves of 5/4; endpoint 5.

Option checks: 9/2: This option differs from the exact result by -1/2. Ask the learner to locate the first changed sign, operation or arithmetic step; the choice alone does not identify a unique misconception. 6: This option differs from the exact result by 1. Ask the learner to locate the first changed sign, operation or arithmetic step; the choice alone does not identify a unique misconception. 9: This option differs from the exact result by 4. Ask the learner to locate the first changed sign, operation or arithmetic step; the choice alone does not identify a unique misconception.

## TEACHER ONLY

# O worked keys 1-2

## 001: $-\frac{4}{9}$

Target: Multiply rational numbers with signed fraction algorithms.

Multiply numerators and denominators:  $(2 \times -2)/(3 \times 3) = -4/9 = -4/9$ . Equal signs give a positive product; different signs give a negative product.

Accept equivalent exact fractions, decimals or mixed numbers, with requested units and explanation. Check the requested performance as well as the final value; a number alone is incomplete evidence.

## 002: $27/4$ centimeters

Target: Interpret a signed rational product as a contextual change.

3 minutes  $\times$   $(9/4 \text{ centimeters/minute}) = 27/4 \text{ centimeters}$ . The level rises. Repeated sum:  $(9/4) + (9/4) + (9/4) = 27/4$ . Start at 0 and draw 3 equal moves of  $9/4$ ; endpoint  $27/4$ .

Accept equivalent exact fractions, decimals or mixed numbers, with requested units and explanation. The line must have equal intervals and labeled zero; arrows must show the starting value and signed moves in the expression. Check the requested performance as well as the final value; a number alone is incomplete evidence.