

Grade 7 Mathematics Diagnostic and Instructional Response Guide

Independent VALYXIS instructional resource | Jonathan Dallas | October 20, 2026. Free to print for classroom and family use. Not a state-issued assessment or state-endorsed publication.

Scope

- secondary readiness through early Algebra 1. This short tool samples prerequisite skills
- it does not cover every Grade 7 standard, predict state-test performance, or determine placement by itself.

Administration

- Allow about 40-50 minutes or two short sessions. Do not emphasize speed. Students show work and may draw models. Use no calculator for the initial computation sample unless an accommodation requires one
- document calculator use and supports.

Read directions aloud when needed without explaining the mathematical method. Follow student accommodation plans. Accept mathematical reasoning in a home language or through a labeled diagram. Keep language support separate from mathematical prompting.

Student: _____ Date: _____ Class: _____

Directions: Try every question. Show how you know. Mark a question with ? when uncertain. An unfinished response helps your teacher plan the next lesson.

Official reference

- https://www.azed.gov/standards-practices/k-12standards/mathematics-standards. Arizona Grade 7 standards reviewed
- selected matches appear below. Prerequisite items are not relabeled as Grade 7 standards.

How to use the I / P / N ratings

Use these ratings to describe an observed skill, not a percentage score or a placement decision.

I - Independent

The learner demonstrates the skill accurately and explains their thinking without hints or prompts. Follow documented accommodations; accommodations alone do not change an I rating to P.

P - With prompting

The learner demonstrates the skill after a hint, guiding question, example, or visual model. Record the support that helped.

N - Not yet

The learner does not yet demonstrate the skill, even with support. Identify one focused next step and revisit the skill after instruction.

Not observed: Leave the rating blank if you have not observed the skill. Do not assign N solely because a question was skipped.

Record the date and concrete evidence, such as a work sample or student explanation. These letters describe current evidence and may change as the learner progresses.

Student questions 1-6

1. Evaluate 36 - 4 x 5.

Work / explanation: _____

_____

2. Evaluate 18 / 3 + 2 squared.

Work / explanation: _____

_____

3. A club packs 144 pencils equally into 12 boxes. How many per box?

Work / explanation: _____

_____

4. Find 3/4 + 1/6.

Work / explanation: _____

_____

5. Find 2/3 x 9/10.

Work / explanation: _____

_____

6. How many 1/4-cup servings are in 2 cups?

Work / explanation: _____

_____

Student questions 7-12

7. Find 4.8 + 0.67.

Work / explanation: _____

_____

8. Find 0.6 x 0.4.

Work / explanation: _____

_____

9. Write 0.375 as a simplified fraction.

Work / explanation: _____

_____

10. Find 15% of 80.

Work / explanation: _____

_____

11. A $50 backpack is discounted 20%. Find the sale price before tax.

Work / explanation: _____

_____

12. A quantity rises from 40 to 50. What is the percent increase?

Work / explanation: _____

_____

Student questions 13-18

13. Three notebooks cost $7.50. Find the cost per notebook.

Work / explanation: _____

_____

14. A recipe uses 2 cups of rice for 5 people. How much for 15 people?

Work / explanation: _____

_____

15. For x = 1, 2, 3, y = 4, 8, 12. Write the proportional equation.

Work / explanation: _____

_____

16. Find -7 + 12.

Work / explanation: _____

_____

17. Find 5 - (-3).

Work / explanation: _____

_____

18. Find (-4) x (-6).

Work / explanation: _____

_____

Student questions 19-24

19. Simplify 3(x + 4) - 2x.

Work / explanation: _____

_____

20. Solve 3x + 5 = 26.

Work / explanation: _____

_____

21. A club pays $8 plus $3 per member. It spends $29. Write an equation and find the number of members.

Work / explanation: _____

_____

22. Find the area of a triangle with base 8 cm and perpendicular height 5 cm.

Work / explanation: _____

_____

23. Find the volume of a rectangular prism 4 cm by 3 cm by 2 cm.

Work / explanation: _____

_____

24. Find the mean of 6, 8, 10, 12.

Work / explanation: _____

_____

Teacher answer key | questions 1-12

1. 16 - Multiply first

- 4 x 5 = 20
- then subtract.
- 2. 10 - Divide to get 6 and square 2 to get 4
- add.

3. 12 pencils - 144 / 12 = 12.

4. 11/12 - Use twelfths: 9/12 + 2/12.

5. 3/5 - 18/30 simplifies to 3/5.

6. 8 servings - 2 / (1/4) = 8.

7. 5.47 - Align place values: 4.80 + 0.67.

8. 0.24 - Six tenths times four tenths is 24 hundredths.

9. 3/8 - 375/1000 simplifies to 3/8.

10. 12 - 0.15 x 80 = 12.

- 11. $40 - Discount is $10
- subtract from $50.
- 12. 25% - Increase is 10
- 10/40 = 0.25.

Teacher answer key | questions 13-24

13. $2.50 - 7.50 / 3 = 2.50.

14. 6 cups - Scale both quantities by 3.

15. y = 4x - The constant ratio y/x is 4.

16. 5 - Move 12 units right from -7.

17. 8 - Subtracting -3 means adding 3.

18. 24 - A negative times a negative is positive.

19. x + 12 - Distribute: 3x + 12 - 2x.

- 20. x = 7 - Subtract 5, then divide by 3
- check 21 + 5 = 26.
- 21. 8 + 3m = 29
- m = 7 - Subtract the fixed cost, then divide by the per-member cost.

22. 20 square cm - Area = (1/2) x 8 x 5.

23. 24 cubic cm - Volume = 4 x 3 x 2.

- 24. 9 - Sum 36
- divide by 4.

Interpretation | use patterns, then verify

Score each item

- 1 = correct answer with sufficient reasoning or work for the task
- 0 = incorrect, missing, or unsupported. If a correct answer lacks requested work, confer before finalizing. Record accuracy out of 24 alongside reasoning notes.
- Each domain has three questions. A provisional rule for this classroom tool: 0-1 correct suggests an immediate follow-up interview
- 2 suggests targeted practice
- 3 suggests an extension and a transfer check. These thresholds are teacher planning rules, not validated proficiency cut scores.

Number operations

- items 1-3
- correct ____/3
- explanation evidence _____
- next action _____

Fractions

- items 4-6
- correct ____/3
- explanation evidence _____
- next action _____

Decimals

- items 7-9
- correct ____/3
- explanation evidence _____
- next action _____

Percentages

- items 10-12
- correct ____/3
- explanation evidence _____
- next action _____

Ratios and rates

- items 13-15
- correct ____/3
- explanation evidence _____
- next action _____

Integers

- items 16-18
- correct ____/3
- explanation evidence _____
- next action _____

Expressions and equations

- items 19-21
- correct ____/3
- explanation evidence _____
- next action _____

Geometry and data

- items 22-24
- correct ____/3
- explanation evidence _____
- next action _____

Interview: Ask "Show another way," "Why does your method work?" and "What would change if the numbers changed?" Do not infer a disability, course placement, or overall ability from this sample.

Instructional response | number and proportional reasoning

Number operations | Possible pattern

- Treats all operations left to right. Response: Use an operation tree
- compare 36 - 20 with (36 - 4) x 5. Recheck: Evaluate 40 - 3 x 6. Key: 22.

Fractions | Possible pattern

- Adds denominators or inverts the wrong fraction. Response: Use equal-sized fraction strips and measurement division before symbolic rules. Recheck: Find 1/2 + 1/3
- then 3 / (1/2). Key: 5/6
- 6.

Decimals | Possible pattern

- Ignores decimal place value. Response: Use a hundred grid and money models
- estimate the magnitude first. Recheck: Find 2.4 + 0.38
- then 0.3 x 0.2. Key: 2.78
- 0.06.

Percentages | Possible pattern

- Uses the new amount as the percent base. Response: Name the original whole
- represent 100% with a bar. Recheck: A $60 item is reduced 25%. Find the new price. Key: $45.
- Model one example aloud. Solve one together. Let the student solve two independently and explain one. Recheck with new numbers after 48-72 hours
- retain the original work for comparison.

Instructional response | algebra, space, and transfer

Number operations | Possible pattern

- Treats all operations left to right. Response: Use an operation tree
- compare 36 - 20 with (36 - 4) x 5. Recheck: Evaluate 40 - 3 x 6. Key: 22.

Fractions | Possible pattern

- Adds denominators or inverts the wrong fraction. Response: Use equal-sized fraction strips and measurement division before symbolic rules. Recheck: Find 1/2 + 1/3
- then 3 / (1/2). Key: 5/6
- 6.

Decimals | Possible pattern

- Ignores decimal place value. Response: Use a hundred grid and money models
- estimate the magnitude first. Recheck: Find 2.4 + 0.38
- then 0.3 x 0.2. Key: 2.78
- 0.06.

Percentages | Possible pattern

- Uses the new amount as the percent base. Response: Name the original whole
- represent 100% with a bar. Recheck: A $60 item is reduced 25%. Find the new price. Key: $45.

Selected Arizona matches

- Items 10-12: 7.RP.A.3
- 13: 7.RP.A.1
- 14-15: 7.RP.A.2
- 16-17: 7.NS.A.1
- 18: 7.NS.A.2
- 19: 7.EE.A.1
- 20-21: 7.EE.B.4. These are partial matches, not full standard coverage.

Official reference

- https://www.azed.gov/standards-practices/k-12standards/mathematics-standards. Arizona Grade 7 standards reviewed
- selected matches appear below. Prerequisite items are not relabeled as Grade 7 standards.