



Checkpoint Results Interpretation Guide

Grade 3 Mathematics

Tennessee Department of Education | August 2020

The Checkpoint

The Checkpoint can be used at the beginning of the school year to measure retention on **key standard-aligned skills that are most essential** for students to be able to **access, and engage in, on-grade-level content** for the current year. Because of this, the Checkpoints are smaller than a summative TCAP assessment and do not cover all the standards from the previous year. Instead, as recommended by experts¹, they focus on fewer, **prioritized vertically-aligned standards**, with the intent of providing educators more meaningful and actionable information about student needs so you can support your students' ability to access grade-level learning throughout the year.

The Grade 3 Math Checkpoint should be given to incoming fourth grade students to help plan for students learning grade 4 math content this year.

To help students in their learning and teachers with their planning, Checkpoints come with fully **annotated questions** that help to understand trends and pinpoint misconceptions that may inhibit student progress. ***Using this Checkpoint Results Interpretation Guide (the Guide) and your student results data found in the Schoolnet platform, you and your students can plan for great academic success this year.***

It is best to use these results to identify any needed pre-requisite learning and incorporate it throughout the year to ensure students can access grade-level content or can build upon their current strengths. After you administer the Checkpoint and use this Guide to better meet student needs at the beginning of the year, **continue monitoring** your students' progress on **grade-appropriate assignments** for the rest of the year to ensure that these core foundations are continually strengthened.

The Checkpoint IS:

- an investigative tool to determine student readiness for the major work of the current grade
- aligned to the Tennessee State Academic Standards, using TN-educator reviewed questions from previous TCAP exams
- designed to identify student misconceptions and learning needs
- providing actionable next steps for informing instructional decisions

The Checkpoint IS NOT:

- a replacement for the performance level determinations a student would have received on the TCAP assessment
- predictive of, or comparable to, summative TCAP results
- a replacement for RTI² diagnostics or universal screeners
- used to evaluate teacher, school, or district performance
- a tool to change student placement decisions (e.g. retake a course, advance to honors)

¹ https://tntp.org/assets/covid-19-toolkit-resources/TNTP_Learning_Acceleration_Guide.pdf

Contents of this Guide

THE CHECKPOINT

CHECKPOINT DESIGN.....4

INTERPRETING AND USING RESULTS4

AUTOMATIC REPORTING IN SCHOOLNET.....4

OVERALL SCORES.....5

ACTIONABLE INSIGHTS: ANNOTATED QUESTIONS AND REPORTING TOOLS.....6

ANSWER CHOICE RATIONALES IN EACH QUESTION ANNOTATION6

ITEM ANNOTATIONS AND PLANNING FOR INSTRUCTION7

SAMPLE SET OF RATIONALES.....7

GRADE 3 MATH CHECKPOINT ITEM ANNOTATIONS8

ADDITIONAL RESOURCES.....58

“When the COVID-19 pandemic forced prolonged school building closures and canceled spring assessments, it became even more important that districts and schools can reliably gather student data and understand student readiness for the next school year. These free and optional tools are one way the department can support the needs of our district partners in serving all students”

-Commissioner Penny Schwinn

Checkpoint Design

The Checkpoint assessments were designed using **real TCAP questions** from previous summative exams. This ensured each question was aligned to Tennessee state standards and had been reviewed by **Tennessee educators**. The Checkpoint was designed to be quick to access and administer, not requiring complicated adjustments to existing school schedules; with **flexibility for online or paper administration** based on school/district need.

The Math Checkpoint assessments:

1. **are quick easy to administer:** contain two subparts (separated by a section break and new instructions screen) in one short (less than 30 questions) assessment in Schoolnet
2. **include prioritized content:** standards, concepts, and skills from the designated grade-level/course that are considered essential pre-requisite content for accessing the next grade-level's work

Less than 60 minutes

Less than 30 questions

Two subparts: Calculator
& Non-Calculator

Interpreting and Using Results

Automatic Reporting in Schoolnet

In order to support teachers in using these assessments, students who take the assessment online in the Schoolnet platform will have their Checkpoints scored automatically. Teachers have multiple scoring options for students who take the Checkpoints on paper, and you can find how-to documents and videos at <https://tn.mypearsonsupport.com/schoolnet/>. **Checkpoint assessment scoring in Schoolnet requires all answers to be submitted by the student for results to be produced.** The following automated reports can be found in [Schoolnet](#):

- Individual student results
- Classroom level reports
- Standards analysis reports
- Item analysis
- Test comparison reports (e.g., student, class, school, district, and state)
- Shared reporting (e.g., district to school admin, school admin to educators in same content/grade-level)
- Aggregate and disaggregation of demographics

Overall Scores

The score groups on the checkpoint assessment are ***not meant to represent performance levels or the blueprints of the TCAP summative assessments*** (e.g., below, approaching, on track, and mastered). The score groups were designed to **share student preparedness for next grade level content** and provide guidance around the **level of support** students may need to access that content.

Score Group	% Correct	Results	Recommended Next Steps
Orange	0 – 64%	Likely Needs More Targeted Support	Use other sources of data for deeper insight; use identified misconceptions to offer targeted re-teaching, plan differentiation and intervention as needed as grade-level concepts are introduced.
Yellow	65 – 79%	Likely Able to Engage in Grade Level Content with Some Support	Investigate trends in student responses using the most important errors, to support differentiation on grade-level assignments and scaffolding when introducing new content; provide opportunities to check for understanding throughout the lesson to determine differentiation needs.
Green	80 – 99%	Likely Ready for Grade Level Content	Move directly into grade-level content.
Blue	100%	Ready for Grade Level Content	

Overall scoring is automatically available in the Schoolnet platform. This may help with you use the results of the student and class level reports to develop an overall summary and conclusion about your students' readiness for grade-level content. In responding to the Checkpoint assessments, we recommend addressing the learning needs of students **while engaging with on grade-level content**. For more information and tools for using assessment data to drive instructional decision making, review the [Assessing Learning Toolkit](#), pages 18-21, and the [Learning Loss PLC Guide](#).

While overall scoring is provided and can be helpful in planning for group instruction, the most actionable information in these Checkpoints can be found by analyzing at the question-level results.

Actionable Insights: Annotated Questions and Reporting Tools

Each question on the Checkpoint is fully annotated with information that describes the questions as they were used on previous TCAP tests, and automated scoring tools in Schoolnet that make getting that information easier. The most helpful and actionable information is in the **Item Annotations in this Guide** when combined with the **Item Analysis reports in Schoolnet**.

***When we need more time** in the school year, the best way to get it is to spend less time on things they've already mastered and more time on the specific gaps that students need.*

Answer Choice Rationales in each Question Annotation

It is possible that we have multiple students who may not have mastered some of the foundational content required to fully engage in this year's content. We are most effective at addressing these needs when we can pinpoint, as specifically as possible, the conceptual understanding that would most efficiently close this gap. That way we spend less time on previous content by focusing just on the piece that they need to be successful with this concept during the year. The Question Annotations are designed to help with that process.

To help teachers be more efficient in planning for the year, each question on the Checkpoint is accompanied by a set of answer choice rationales **which offers an explanation for each choice**. These annotations are not definitive: we know there may be many reasons for why students might select different answer choices. However, each rationale listed provides an explanation for why students may have selected a given answer choice, including what mis-steps may have caused them to select an incorrect answer (a "distractor"). These distractor rationales provide an instructional target to improve student understanding by breaking down and diagnosing the likely conceptual mistake, allowing you to **follow up with targeted instruction based on the most common mathematical errors you identify** for your specific group of students. These annotations assume that students tried their best and cannot provide information about whether students selected an option at random.

Annotations and Planning for Instruction

The department recommends in using this guide that educators look for trends in incorrect answers using the Item Analysis reporting on Schoolnet and then use the annotations using this process:

1. Find the highest-leverage error trend,
 - A. This can mean comparing the frequency of each student error or understanding the group of students represented by that trend.
2. Unpack the conceptual misunderstanding that led to the most important error, and then use the annotations to support analyzing the incorrect answer by thinking through these questions in order:
 - A. What DO these students understand?
 - B. Based on what students do understand, why might a student think their error was a reasonable choice?
 - C. What specific concept, if they had understood it clearly, would have made them recognize that the error was not a reasonable approach?
3. Put it all together to check your thinking by restating the answers to each of the three questions to articulate this sentence stem:

"Students understood [question A] but made the error of [student error], because they thought [question B] made sense. If they had understood [question C], they would have avoided the error."

This practice of pinpointing misconceptions and target understandings can help with long term planning to support students in accessing year-long content and making the most of the start of year Checkpoint.

Sample Set of Rationales

Rationales	
Incorrect – 1	Students choosing this answer likely skipped a step in multiplying (7×10). Students choosing this answer may need additional support in setting up the multiplication algorithm and tracking that they multiply each multiplicand by the multiplier.
Incorrect – 2	Students choosing this answer likely skipped multiplying 7 by the tens place, instead adding the regrouped 30 to the ten in the multiplicand. Students choosing this answer may need additional support in multiplying with regrouping.
Correct – 3	This problem requires students to understand the process involved to multiply a whole number of four digits by a one-digit whole number and using strategies based on place value and the properties of operations. To determine the correct product, students should have multiplied the multiplicand (2,815) by the multiplier (7) while remembering to regroup correctly.
Incorrect – 4	Students choosing this answer likely added the regrouped tens (30) before multiplying by 7. Students choosing this answer may need additional support or practice in the order of operations while multiplying a whole number of four digits by a one-digit whole.

Grade 3 Math Checkpoint Item Annotations

Item Information

Item Code: TN322500

Grade Level: 3

Standard Code: 3.NF.A.3.c

Position No: 1

Standard Text: Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers.

Calculator: N

Correct Answer: B

What number goes in the box to make the equation true?

$$\frac{\boxed{}}{2} = 1$$

- A.** 1
- B.** 2
- C.** 4
- D.** 8

Rationales	
Incorrect – 1	Students associated the numerator of 1 as equal to 1 whole rather than recognizing the fraction $\frac{1}{2}$ as less than or not equivalent to 1 whole. Students may need additional support with distinguishing between fractional parts representing less than 1 whole, and fractional parts that represent 1 whole.
Correct – 2	Students correctly identified the numerator of 2 and the fraction $\frac{2}{2}$ as equivalent to 1 whole. This item required students to recognize that when the total equal parts of a fraction (denominator) and the total parts being considered (numerator) are the same, the fraction is equivalent to 1 whole. Students also understand that 1 whole can be represented by fractional parts when all of the equal parts within that fraction are represented.
Incorrect – 3	Students recognized the denominator 2 as a divisor of the numerator 4. This misconception would lead to the fractional parts represented being equivalent to 2 wholes rather than 1. Students may need additional support with distinguishing between fractional parts that are greater than 1 whole and fractions that represent 1 whole.
Incorrect – 4	Students recognized the denominator 2 as a divisor of the numerator 8. This misconception would lead to the fractional parts represented being equivalent to 4 wholes rather than 1. Students may need additional support with distinguishing between fractional parts that are greater than 1 whole and fractions that represent 1 whole.

Item Information

Item Code: TN432442

Grade Level: 3

Standard Code: 3.OA.A.3

Position No: 2

Standard Text: Multiply and divide within 100 to solve contextual problems, with unknowns in all positions, in situations involving equal groups, arrays, and measurement quantities using strategies based on place value, the properties of operations, and the relationship between multiplication and division (e.g., contexts including computations such as $3 \times ? = 24$, $6 \times 16 = ?$, $? \div 8 = 3$, or $96 \div 6 = ?$)

Calculator: N

Correct Answer: D

There are 5 rows with 7 desks in each row.

What is the total number of desks?

- A.** 2
- B.** 12
- C.** 28
- D.** 35

Rationales	
Incorrect – 1	Students subtracted the number of desks in each row from the number of rows ($7 - 5 = 2$) instead of applying concepts of multiplication. Students may need additional support modeling and solving contextual problems for situations involving arrays.
Incorrect – 2	Students added the number of desks in each row with the number of rows ($7 + 5 = 12$) instead of applying concepts of multiplication. Students may need additional support modeling and solving contextual problems for situations involving arrays.
Incorrect – 3	Students correctly applied concepts of multiplication but miscalculated the product as $7 \times 5 = 28$ rather than $7 \times 5 = 35$. Students may need additional support developing fluency with all products of two single-digit numbers.
Correct – 4	Students correctly recognized that 5 rows with 7 desks in each row is a total of 35 desks. ($5 \times 7 = 35$) This item required students to recognize that to find a total involving rows of equal numbers, multiplicative properties are needed, and then to correctly apply concepts of multiplication (arrays/fluency) to solve the problem.

Item Information

Item Code: TN132525

Grade Level: 3

Standard Code: 3.MD.C.7.a

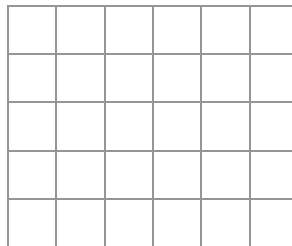
Position No: 3

Standard Text: Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths.

Calculator: N

Correct Answer: B

This rectangle is tiled with unit squares.



Which expression can be used to find the area of the rectangle?

- A.** $6 + 5$
- B.** 6×5
- C.** $7 + 6$
- D.** 7×6

Rationales	
Incorrect – 1	Students correctly identified the length of this rectangle as 6 units and the width as 5 units, but added the length and width to solve for area instead of multiplying ($6 + 5 = 11$). Students may need additional support in distinguishing what is meant by the area of a figure versus other traits of the figure such as side lengths and perimeter.
Correct – 2	Students correctly identified the length of this rectangle as 6 units and the width as 5 units, and knew to multiply the length and width to determine the area (6×5). This item required students to correctly count tiles to identify the length and width, and apply concepts of multiplication to solve for area.
Incorrect – 3	Students incorrectly identified the length of the rectangle as 7 units and the width as 6 units and added the length and width instead of multiplying to solve for area ($7 + 6$). Students may need additional support that focuses on understanding side lengths of figures made of tiles as numbers of tiles rather than numbers of gridlines. Then the students may need support in understanding what is meant by area of a figure.
Incorrect – 4	Students incorrectly identified the length of the rectangle as 7 units and the width as 6 units, but knew to multiply the length and width to determine area. Students may understand how to apply concepts of multiplication to solve for area but may need additional support counting tiles instead of gridlines to correctly identify length and width.

Item Information

Item Code: TN592385

Grade Level: 3

Standard Code: 3.NF.A.1

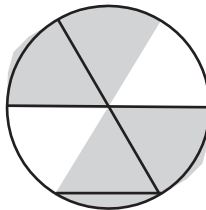
Position No: 4

Standard Text: Understand a fraction, $\frac{1}{b}$, as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$.

Calculator: N

Correct Answer: A

This circle shows equal-sized parts.



What fraction of the circle is shaded?

- A.** $\frac{4}{6}$
- B.** $\frac{2}{4}$
- C.** $\frac{2}{6}$
- D.** $\frac{1}{4}$

Rationales	
Correct – 1	Students correctly identified the total number of equal parts (denominator) present in the circle as 6 and the number of shaded parts (numerator) as 4 ($\frac{4}{6}$). This item required that students correctly identify $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$ when provided a visual representation.
Incorrect – 2	Students incorrectly identified the denominator as 4 because they represented the shaded parts as the denominator rather than the total number of equal parts partitioned in the circle. Students incorrectly identified the numerator as 2 because they represented the unshaded parts as the numerator rather than the number of shaded parts. Students may need additional support identifying the numerator as the total number of shaded parts and the denominator as the total number of equal parts in a whole.
Incorrect – 3	Students correctly identified the denominator as 6, but incorrectly identified the numerator as 2 because they represented the unshaded parts as the numerator rather than the shaded parts ($\frac{2}{6}$). Students may need additional support in first identifying the total number of equal-sized parts in one whole to determine a denominator and then in understanding what fraction of the whole is modeled by shading different numbers of portions of the whole.
Incorrect – 4	Students incorrectly identified the denominator as 4 because they represented the shaded parts as the denominator rather than the total number of equal parts partitioned in the circle. Students incorrectly represented the number of shaded parts as 1. Students may need additional support in first identifying the total number of equal-sized parts in one whole to determine a denominator and then in understanding what fraction of the whole is modeled by shading different numbers of portions of the whole.

Item Information

Item Code: TN716122

Grade Level: 3

Standard Code: 3.OA.B.6

Position No: 5

Standard Text: Understand division as an unknown-factor problem.

Calculator: N

Correct Answer: C

Which equation can be used to find the unknown number in $48 \div 8 = \square$?

A. $4 \times \square = 8$

B. $4 \times \square = 48$

C. $8 \times \square = 48$

D. $8 \div \square = 48$

Rationales	
Incorrect – 1	Students incorrectly identified the unknown factor of 48 divided by 8 as the same unknown factor that makes the equation $4 \times _ = 8$ true (2). Students may have thought that switching the missing value box and 8 in the equation would result in finding the relationship between multiplication and division in the equation. Students may need additional support identifying the relationship between multiplication and division to solve unknown-factor equations.
Incorrect – 2	Students incorrectly identified the unknown factor of 48 divided by 8 as the same unknown factor that makes $4 \times _ = 48$ true (12). Students may have thought that switching the missing value box and 48 in the equation would result in finding the relationship between multiplication and division in the equation. Students may need additional support using related facts of multiplication and division to solve unknown-factor equations.
Correct – 3	Students correctly identified the unknown factor of 48 divided by 8 as the same unknown factor that makes the equation $8 \times _ = 48$ true (6). This item required students to identify the mathematical relationship that exists between multiplication and division to solve an unknown-factor problem.
Incorrect – 4	Students incorrectly identified the unknown factor of 48 divided by 8 as the same unknown factor that makes $8 \div _ = 48$ true. Students may have thought that a divisor can be changed to a dividend the same way factors in a product can be switched without changing the product. This reasoning is evidence that students may not recognize specific properties of division and multiplication. Students may need additional support distinguishing between properties of multiplication and division and relating multiplication and division facts.

Item Information

Item Code: TN682344

Grade Level: 3

Standard Code: 3.OA.C.7

Position No: 6

Standard Text: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of 3rd grade, know from memory all products of two one-digit numbers and related division facts.

Calculator: N

Correct Answer: A,B,E

Which quotients are equal to 2? Choose the **three** correct answers.

- A.** $6 \div 3$
- B.** $10 \div 5$
- C.** $18 \div 6$
- D.** $16 \div 4$
- E.** $12 \div 6$
- F.** $14 \div 2$

Rationales	
Correct – 1	Students correctly applied concepts of multiplication and division to identify 6 divided by 3 as having a quotient of 2. This item requires students to use strategies such as the relationship between multiplication and division to fluently multiply and divide within 100.
Correct – 2	Students correctly applied concepts of multiplication and division to identify 10 divided by 5 as having a quotient of 2. This item requires students to use strategies such as the relationship between multiplication and division to fluently multiply and divide within 100.
Incorrect – 3	Students incorrectly applied concepts of multiplication and division to solve for 18 divided by 6 which has a quotient of 3 rather than 2. Students may need additional support with use of strategies such as the relationship between multiplication and division and properties of operations to help build fluency multiplying and dividing within 100.
Incorrect – 4	Students incorrectly applied concepts of multiplication and division to solve for 16 divided by 4 which has a quotient of 4 rather than 2. Students may need additional support with use of strategies such as the relationship between multiplication and division and properties of operations to help build fluency multiplying and dividing within 100.
Correct – 5	Students correctly applied concepts of multiplication and division to identify 12 divided by 6 as having a quotient of 2. This item requires students to use strategies such as the relationship between multiplication and division to fluently multiply and divide within 100.
Incorrect – 6	Students incorrectly applied concepts of multiplication and division to solve for 14 divided by 2 which has a quotient of 7 rather than 2. Students may need additional support with use of strategies such as the relationship between multiplication and division and properties of operations to help build fluency multiplying and dividing within 100.

Item Information

Item Code: TN696056

Grade Level: 3

Standard Code: 3.OA.D.8

Position No: 7

Standard Text: Solve two-step contextual problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Calculator: N

Correct Answer: D

Randa has 15 markers. Peggy gives her 3 more markers. Randa and Peggy equally share all the markers.

How many markers do Randa and Peggy **each** have?

- A.** 3
- B.** 6
- C.** 8
- D.** 9

Rationales	
Incorrect – 1	Students recognize Peggy had 3 markers to give. Students may need additional support distinguishing between properties of operation and applying those concepts in two-step contextual word problems.
Incorrect – 2	Students incorrectly subtracted the total number of markers Randa had from the number of markers Peggy had ($15 - 3 = 12$) which gave them 12. Students divided the number of markers (12) into two equal groups ($12 \text{ divided by } 2 = 6$) for a total of 6 markers. Students may need additional support distinguishing between properties of operation and applying those concepts in two-step contextual word problems.
Incorrect – 3	Students incorrectly calculated 18 divided by 2 is 8. Students may need additional support distinguishing between properties of operation and applying those concepts in two-step contextual word problems and with building fluency in multiplying within 100.
Correct – 4	Students correctly combined the total number of markers (addition) that Peggy and Sue have ($15 + 3 = 18$), and then divided the number of markers into two equal groups ($18 \div 2 = 9$) for a total of 9 markers. This item required students to solve two-step contextual problems using more than one operation (addition and division).

Item Information

Item Code: TN782334

Grade Level: 3

Standard Code: 3.OA.C.7

Position No: 8

Standard Text: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of 3rd grade, know from memory all products of two one-digit numbers and related division facts.

Calculator: N

Correct Answer: C,E

Which equations are **true**? Choose the **two** correct answers.

A. $8 \times 2 = 14$

B. $42 \div 7 = 8$

C. $32 \div 4 = 8$

D. $8 \times 7 = 42$

E. $8 \times 4 = 32$

F. $14 \div 2 = 8$

Rationales	
Incorrect – 1	Students incorrectly applied concepts of multiplication and division to solve $8 \times 2 = 14$, but the correct product is 16. Students may need additional support with use of strategies such as the relationship between multiplication and division and properties of operations to help build fluency multiplying and dividing within 100.
Incorrect – 2	Students incorrectly applied concepts of multiplication and division to solve $42 \div 7 = 8$, but the correct quotient is 6. Students may need additional support with use of strategies such as the relationship between multiplication and division and properties of operations to help build fluency multiplying and dividing within 100.
Correct – 3	Students correctly applied concepts of multiplication and division to identify $32 \div 4$ as having a quotient of 8. This item requires students to use strategies such as the relationship between multiplication and division and properties of operations to fluently multiply and divide within 100.
Incorrect – 4	Students incorrectly applied concepts of multiplication and division to solve $8 \times 7 = 42$, but the correct product is 56. Students may need additional support with use of strategies such as the relationship between multiplication and division and properties of operations to help build fluency multiplying and dividing within 100.
Correct – 5	Students correctly applied concepts of multiplication and division to solve $8 \times 4 = 32$. This item requires students to use strategies such as the relationship between multiplication and division and properties of operations to fluently multiply and divide within 100.
Incorrect – 6	Students incorrectly applied concepts of multiplication and division to identify $14 \div 2 = 8$, but the correct quotient is 7. Students may need additional support with use of strategies such as the relationship between multiplication and division and properties of operations to help build fluency multiplying and dividing within 100.

Item Information

Item Code: TN156092

Grade Level: 3

Standard Code: 3.OA.B.5

Position No: 9

Standard Text: Apply properties of operations as strategies to multiply and divide. (Students need not use formal terms for these properties.)

Calculator: N

Correct Answer: A,D,E

Which equations are **true**? Choose the **three** correct answers.

A. $(3 \times 2) \times 4 = 3 \times (2 \times 4)$

B. $4 \times 6 = 4 + 6$

C. $(5 + 1) \times 4 = 5 + (1 \times 4)$

D. $6 \times 4 = 4 \times 6$

E. $4 \times 6 = (4 \times 5) + (4 \times 1)$

Rationales	
Correct – 1	Students correctly applied properties of operations as strategies to multiply. They understood that $(3 \times 2) \times 4 = 6 \times 4$ or 24 and that $3 \times (2 \times 4) = 3 \times 8 = 24$ so the equation is correct.
Incorrect – 2	Students incorrectly equated the operations of multiplication and addition. Students recognized that the numbers on each side of the equation are the same but did not recognize or understand that the operations are different and result in different values. Students may need additional support distinguishing the different operation symbols and articulating what they mean and then applying appropriate strategies for calculating.
Incorrect – 3	Students incorrectly applied properties of operations in which parentheses are used. Students recognized that the same values and operations are used on each side of the equation but disregarded the parentheses indicating operations to be completed first. Students may need additional support applying properties of operations as they relate to order of operations in expressions that use parentheses to identify which operations to complete first.
Correct – 4	Students correctly applied properties of operations as strategies to multiply and divide. They understood that the order of the factors 6 and 4 does not change the product of the factors, recognizing that $6 \times 4 = 24 = 4 \times 6$.
Correct – 5	Students correctly applied properties of operations as strategies to multiply. They understood that multiplying 4 by 6 is equivalent to multiplying 4 by 5 to get 20 and multiplying 4 by 1 to get 4 and then adding those products yields the same result of 24.

Item Information

Item Code: TN252341

Grade Level: 3

Standard Code: 3.OA.C.7

Position No: 10

Standard Text: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of 3rd grade, know from memory all products of two one-digit numbers and related division facts.

Calculator: N

Correct Answer: A,D

Which products are equal to 36? Choose the **two** correct answers.

A. 6×6

B. 7×5

C. 3×6

D. 4×9

E. 9×7

Rationales	
Correct – 1	Students correctly applied concepts of multiplication and division to determine the product 6×6 is equal to 36. This item requires students to use strategies such as the relationship between multiplication and division and properties of operations to fluently multiply and divide within 100.
Incorrect – 2	Students incorrectly applied concepts of multiplication and division to solve 7×5 as equal to 36 but the product is 35. Students may need additional support with use of strategies such as the relationship between multiplication and division and properties of operations to help build fluency multiplying and dividing within 100.
Incorrect – 3	Students incorrectly applied concepts of multiplication and division to solve 3×6 as equal to 36, but the product is 18. Students may need additional support with use of strategies such as the relationship between multiplication and division and properties of operations to help build fluency multiplying and dividing within 100.
Correct – 4	Students correctly applied concepts of multiplication and division to determine the product 4×9 is equal to 36. This item requires students to use strategies such as the relationship between multiplication and division and properties of operations to fluently multiply and divide within 100.
Incorrect – 5	Students incorrectly applied concepts of multiplication and division to solve 9×7 as equal to 36, but the product is 63. Students may need additional support with use of strategies such as the relationship between multiplication and division and properties of operations to help build fluency multiplying and dividing within 100.

Item Information

Item Code: TN422518
Standard Code: 3.OA.D.8

Grade Level: 3
Position No: 11

Standard Text: Solve two-step contextual problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Calculator: N
Correct Answer: C

Bella sold boxes of cookies to her neighbors to raise money for her basketball team. She sold:

- 4 boxes to Mr. Jacobs
- 6 boxes to Mrs. Harris

Each box had 9 cookies.

How many total cookies did Bella sell?

- A.** 10
- B.** 19
- C.** 90
- D.** 100

Rationales	
Incorrect – 1	Students correctly combined the number of boxes sold to Mr. Jacobs and Mrs. Harris, $4 + 6 = 10$, but then did not make the further calculation to convert the boxes to a total number of cookies based on each box having 9 cookies. Students may need additional support in determining all the steps needed to answer a question and in attending to units the values in a problem represent. In this case, students could articulate that they found 10 boxes in their addition but that the question asked for a total number of cookies.
Incorrect – 2	Students combined all of the values given in the problem, calculating $4 + 6 + 9 = 19$. Students may need additional support in modeling (e.g. physically, verbally, pictorially) a problem situation to aid in their understanding of the steps needed to determine a final answer.
Correct – 3	Students recognized that there are 9 cookies in each box and correctly multiplied 4×9 to represent the number of cookies sold to Mr. Jacobs (36) and 6×9 to represent the number of cookies sold to Mrs. Harris (54). Students then combined both numbers to determine the total number of cookies sold as 90 ($36 + 54 = 90$). This item required students to solve two-step contextual problems using more than one operation.
Incorrect – 4	Students recognized that there are 9 cookies in each box and correctly multiplied 4×9 to represent the number of cookies sold to Mr. Jacobs (36) and 6×9 to represent the number of cookies sold to Mrs. Harris (54). Students then combined both amounts to determine the total number of cookies sold as 90 ($36 + 54 = 90$), but added an additional 10 to use the given values of 4 and 6 in a separate operation [alternate possibility: Students correctly set up an equation to multiply 10 (from $6 + 4$) $\times 9$. Students recognized that 0×9 is zero, but instead of multiplying 1×9 they added 1 and 9 to make 10, for a total of 100]. Students may need additional support in attending to units the values in a problem represent. In this case, students could articulate that the additional step of adding the sum of 4 and 6 would be mixing units of cookies and boxes for a total.

Item Information

Item Code: TN202280

Grade Level: 3

Standard Code: 3.MD.C.7.a

Position No: 12

Standard Text: Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths.

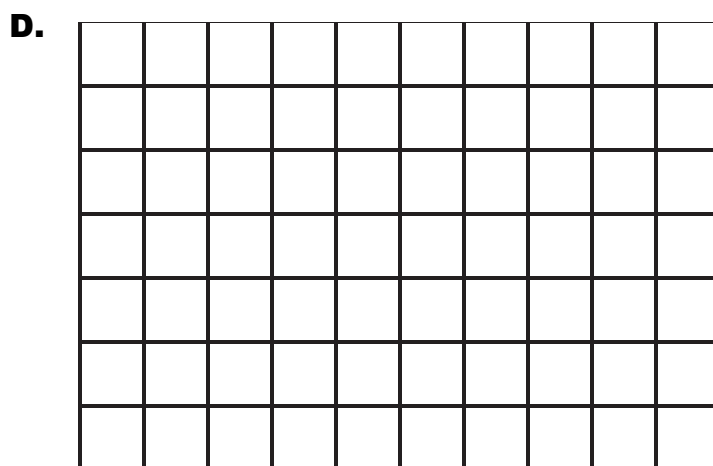
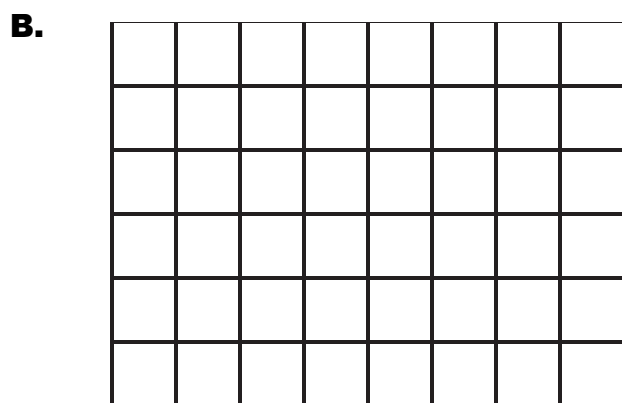
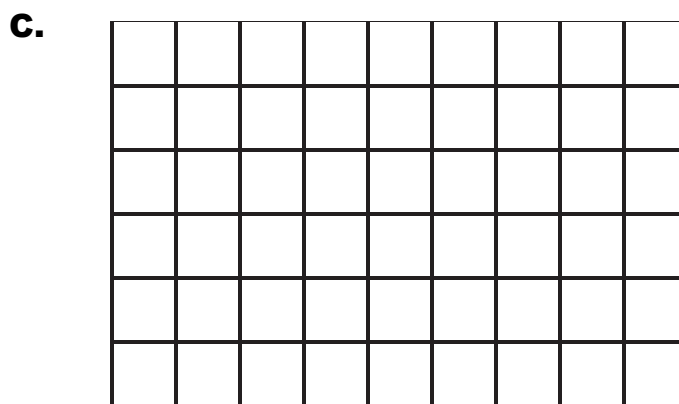
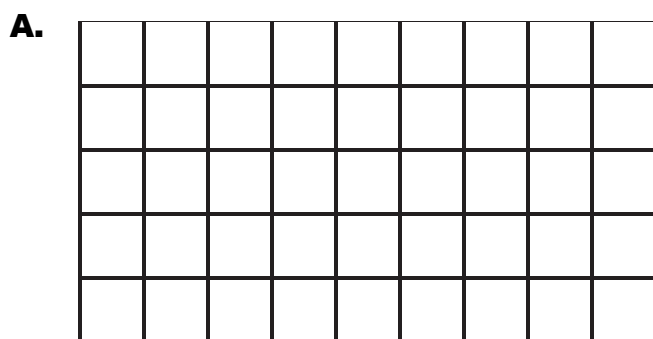
Calculator: Y

Correct Answer: C

Here is an equation.

$$6 \times 9 = 54$$

The equation can be used to find the area, in square units, of which rectangle?



Rationales	
Incorrect – 1	Students may have counted one side length incorrectly as 6 instead of 5 or may have counted the total number of squares incorrectly. Students may need additional support in understanding how to find the side lengths of a rectangle correctly when it is tiled with unit squares.
Incorrect – 2	Students may have counted one side length incorrectly as 9 instead of 8 or may have counted the total number of squares incorrectly. Students may need additional support in understanding how to find the side lengths of a rectangle correctly when it is tiled with unit squares.
Correct – 3	Students correctly associated the equation of $6 \times 9 = 54$ with the rectangle that has an area of 54 square units. This item required students to find the area of a rectangle by using the tiling to determine side lengths and then recognizing that the area is the same as the product of the side lengths.
Incorrect – 4	Students may have counted the total number of individual squares incorrectly. Students may need additional support in understanding how to find the side lengths of a rectangle correctly when it is tiled with unit squares and may benefit from working with arrays of various shapes and how the numbers of rows and columns of shapes relate to multiplication strategies.

Item Information

Item Code: TN906048

Grade Level: 3

Standard Code: 3.OA.D.8

Position No: 13

Standard Text: Solve two-step contextual problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Calculator: Y

Correct Answer: C

Wilbur has 400 stickers.

- He gives 9 stickers each to 8 of his friends.
- He keeps the remaining stickers for himself.

Which is the **best** estimate of the number of stickers that Wilbur keeps for himself?

- A.** 40
- B.** 80
- C.** 330
- D.** 380

Rationales	
Incorrect – 1	Students estimated that each student received 10 stickers, then divided 400 by 10 for a quotient of 40 stickers per student. Students did not continue to solve the problem of determining the number of stickers Wilbur kept. Students may need additional support determining when they have completed all the steps necessary to solve a two-step contextual problem.
Incorrect – 2	Students correctly multiplied $9 \times 8 = 72$ but incorrectly rounded 72 to 80 to estimate that a total of 80 stickers was distributed amongst Wilbur's friends. Students did not continue to solve the problem of determining the number of stickers Wilbur kept. Students may need additional support determining when they have completed all the steps necessary to solve a two-step contextual problem and in rounding values correctly when estimating.
Correct – 3	Students correctly multiplied $9 \times 8 = 72$ to determine the total number of stickers distributed amongst friends. Students used 70 instead of 72 to then estimate the number of stickers Wilbur kept by subtracting 70 from 400, calculating $400 - 70 = 330$. This item required students to solve a two-step contextual problem using more than one operation and estimate to assess the reasonableness of their answer.
Incorrect – 4	Students added 9 and 8 instead of multiplying 9 and 8 to determine an incorrect total of 17 stickers that were distributed amongst Wilbur's friends. Students then used rounding to estimate that 17 is close to 20 and subtracted 20 from 400 for a final answer of 380. Students may need additional support recognizing the operation to use to find a total representing multiplication or repeated addition.

Item Information

Item Code: TN232683

Grade Level: 3

Standard Code: 3.NF.A.2.b

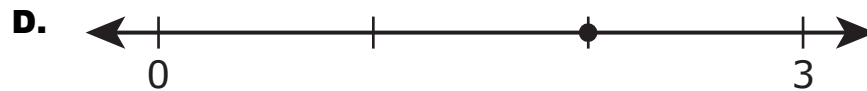
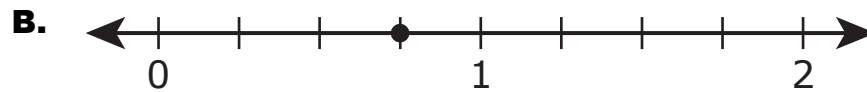
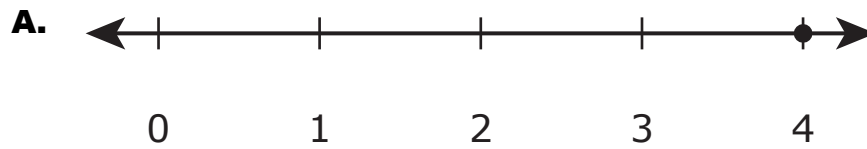
Position No: 14

Standard Text: Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

Calculator: Y

Correct Answer: B,E

Which number lines have a point at $\frac{3}{4}$? Choose the **two** correct answers.



Rationales	
Incorrect – 1	Students identified 4 wholes on a number line instead of $\frac{3}{4}$. Students may need additional support understanding the meaning of the numerator and the meaning of the denominator in a fraction.
Correct – 2	Students correctly identified $\frac{3}{4}$ on a number line that represents more than one whole. This item required students to recognize the total parts within each whole as a denominator of 4, while identifying the point plotted as representation of the numerator of the fraction.
Incorrect – 3	Students identified $\frac{1}{4}$ on a number line instead of $\frac{3}{4}$, perhaps by counting back from 1 instead of counting forward starting from zero. Students may need additional support understanding how the numerator of a fraction relates to intervals on a number line.
Incorrect – 4	Students identified 2 wholes on a number line instead of $\frac{3}{4}$, perhaps by noting a total of 4 tick marks and a point on the third tick mark. Students may need additional support understanding the meaning of the numerator and the meaning of the denominator in a fraction
Correct – 5	Students correctly identified $\frac{3}{4}$ on a number line that represents one whole. This item required students to recognize the total parts within this whole as a denominator of 4, while identifying the point plotted as representation of the numerator of the fraction.

Item Information

Item Code: TN186105

Grade Level: 3

Standard Code: 3.OA.D.9

Position No: 15

Standard Text: Identify arithmetic patterns (including patterns in the addition and multiplication tables) and explain them using properties of operations.

Calculator: Y

Correct Answer: A

Avery uses a rule to make this pattern.

17, 41, 65, 89

Which number sentence shows the rule being used to find the next number in the pattern?

A. $89 + 24 = 113$

B. $89 + 34 = 123$

C. $89 + 65 = 154$

D. $89 + 72 = 161$

Rationales	
Correct – 1	Students correctly recognized the rule of the pattern as adding 24 to each term to determine the following term. Students then understood that the next term in the pattern would take the last number shown and add 24, $89 + 24 = 113$. This item required students to identify the rule in an arithmetic pattern and apply the rule to determine the next term in the pattern.
Incorrect – 2	Students incorrectly calculated the rule of the pattern as adding 34 to each term to get the next term, likely due to a calculation error in finding the difference between two terms. Students represented the next term in the pattern as $89 + 34 = 123$. Students may need support in being accurate with calculations and should be encouraged to use different consecutive pairs of terms in a pattern to test the rule to ensure accuracy.
Incorrect – 3	Students incorrectly identified the rule of the pattern as adding 65, possibly reasoning that the pattern adds two consecutive terms to determine the next term. Students represented the next term in the pattern as $89 + 65 = 154$. Students may need support using calculations to determine what rule is being used to generate a pattern.
Incorrect – 4	Students likely found the difference between the first and last terms given in the pattern ($89 - 17 = 72$) and then added this difference to the last term shown. Students then represented the next term in the pattern as $89 + 72 = 161$. Students may need support using calculations to determine what rule is being used to generate a pattern including support in understanding that the rule is the same between each pair of consecutive terms in the pattern.

Item Information

Item Code: TN892396

Grade Level: 3

Standard Code: 3.NF.A.1

Position No: 16

Standard Text: Understand a fraction, $\frac{1}{b}$, as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$.

Calculator: Y

Correct Answer: D

Rachel has 8 jelly beans. She has 1 red jelly bean.

What fraction of Rachel's jelly beans are red?

- A.** $\frac{8}{1}$
- B.** 1
- C.** $\frac{7}{8}$
- D.** $\frac{1}{8}$

Rationales	
Incorrect – 1	Students incorrectly represented the fraction of red jelly beans as $\frac{8}{1}$ instead of $\frac{1}{8}$. Students may have reasoned that this answer was correct because of the digits, but struggled distinguishing between the numerator and denominator. Students may need additional support identifying the denominator as the total number of parts a whole is divided into and the numerator as the number of parts considered in the context.
Incorrect – 2	Students incorrectly represented the fraction of red jelly beans as 1 whole, possibly because the context is about the fraction of a set of individual objects rather than a fraction of a single figure or object. Students may need additional support understanding what is meant by a fraction of a set of objects.
Incorrect – 3	Students incorrectly represented the fraction of red jelly beans as $\frac{7}{8}$, possibly determining the fraction that is not red instead of the fraction that is red. Students may need additional support identifying the numerator of a fraction and how it relates to a contextual situation.
Correct – 4	Students correctly represented the fraction of red jelly beans as $\frac{1}{8}$. This item required students to correctly identify the total number of parts as the denominator of the fraction and the represented parts as the numerator of the fraction.

Item Information

Item Code: TN072276

Grade Level: 3

Standard Code: 3.MD.C.7.b

Position No: 17

Standard Text: Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real-world and mathematical problems and represent whole-number products as rectangular areas in mathematical reasoning.

Calculator: Y

Correct Answer: C

A rectangular hallway is 3 feet wide and 9 feet long.

What is the area, in square feet, of the hallway?

- A.** 12
- B.** 16
- C.** 27
- D.** 39

Rationales	
Incorrect – 1	Students added the length and width instead of multiplying ($9 + 3 = 12$). Students may need additional support visualizing a described area and may benefit from tiling the area given the length and width.
Incorrect – 2	Students likely multiplied incorrectly when determining the area and thought that $3 \times 9 = 16$ instead of 27. Students may need additional support in calculating carefully and in fluency with multiplying two single-digit numbers.
Correct – 3	Students correctly multiplied the length and width to determine the area ($9 \times 3 = 27$) is 27 square feet. This item required students to multiply side lengths to determine area of a rectangle in the context of solving a real-world problem.
Incorrect – 4	Students likely combined the digits 3 and 9 to determine area as 39 square feet. Students may need additional support in understanding the concept of area and what is being asked in a problem involving calculating area.

Item Information

Item Code: TN622504

Grade Level: 3

Standard Code: 3.NF.A.3.b

Position No: 18

Standard Text: Recognize and generate simple equivalent fractions (e.g., $\frac{1}{2} = \frac{2}{4}$, $\frac{4}{6} = \frac{2}{3}$) and explain why the fractions are equivalent using a visual fraction model.

Calculator: Y

Correct Answer: A,C,E

Choose **all** the fractions equivalent to $\frac{2}{4}$.

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{3}{6}$

D. $\frac{4}{6}$

E. $\frac{4}{8}$

Rationales	
Correct – 1	Students correctly identified the fraction $\frac{1}{2}$ as equivalent to $\frac{2}{4}$. This item required students to recognize and generate simple equivalent fractions. In this option, students correctly reasoned that 2 parts out of 4 in one whole is the same as 1 out of 2 parts when the same whole is divided into 2 parts instead of 4.
Incorrect – 2	Students incorrectly identified fraction $\frac{1}{3}$ as equivalent to $\frac{2}{4}$, likely because they recognized that the numerators differed by 1 and the denominators differed by 1 and reasoned that this equal difference indicated equivalency. Students may need additional support using fraction models of equivalent fractions that do not adhere to this reasoning to help guide them to a better understanding of what makes fractions equivalent.
Correct – 3	Students correctly identified fraction $\frac{3}{6}$ as equivalent to $\frac{2}{4}$. This item required students to recognize and generate simple equivalent fractions. In this option, students correctly reasoned that 3 parts out of 6 in one whole is the same as 1 out of 2 parts when the same whole is divided into 2 parts instead of 6.
Incorrect – 4	Students incorrectly identified fraction $\frac{4}{6}$ as equivalent to $\frac{2}{4}$ likely because they recognized that the numerators differed by 2 and the denominators differed by 2 and reasoned that this equal difference indicated equivalency. Students may need additional support using fraction models of equivalent fractions that do not adhere to this reasoning to help guide them to a better understanding of what makes fractions equivalent.
Correct – 5	Students correctly identified fraction $\frac{4}{8}$ as equivalent to $\frac{2}{4}$. This item required students to recognize and generate simple equivalent fractions. In this option, students correctly reasoned that 4 parts out of 8 in one whole is the same as 1 out of 2 parts when the same whole is divided into 2 parts instead of 8.

Item Information

Item Code: TN721734

Grade Level: 3

Standard Code: 3.OA.B.6

Position No: 19

Standard Text: Understand division as an unknown-factor problem.

Calculator: Y

Correct Answer: D

Which is another equation that can be used to solve $56 \div 7 = a$?

A. $56 - 7 = a$

B. $56 - a = 7$

C. $a \times 56 = 7$

D. $a \times 7 = 56$

Rationales	
Incorrect – 1	Students incorrectly identified $56 - 7 = a$ as an equation that can be used to solve $56 \div 7 = a$. Students likely connected the operation of division with repeated subtraction but did not use the connection properly. Students may need additional support in relating the operation of division to multiplication and would benefit from solving for the unknown in each equation to recognize that the outcome must be the same in each for the equations to be related.
Incorrect – 2	Students incorrectly identified $56 - a = 7$ as an equation that can be used to solve $56 \div 7 = a$. Students may have misread the division symbol as a subtraction symbol instead and would then have chosen a correct relationship. Students may need additional support in identifying operation symbols and then in understanding relationships between division and multiplication.
Incorrect – 3	Students incorrectly identified $a \times 56 = 7$ as an equation that can be used to solve $56 \div 7 = a$. Students recognized that multiplication is the inverse operation of division but then used the 57 and 7 incorrectly in the relationship. Students may need additional support in understanding how the properties of multiplication differ from the properties of division, specifically that division is not commutative as multiplication is, so the placement of dividends and divisors is not interchangeable.
Correct – 4	Students correctly identified $a \times 7 = 56$ as an equation that can be used to solve $56 \div 7 = a$. This item required students to recognize the mathematical relationship that exists between multiplication and division to solve an unknown-factor problem.

Item Information

Item Code: TN532769

Grade Level: 3

Standard Code: 3.OA.A.1

Position No: 20

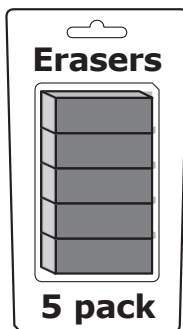
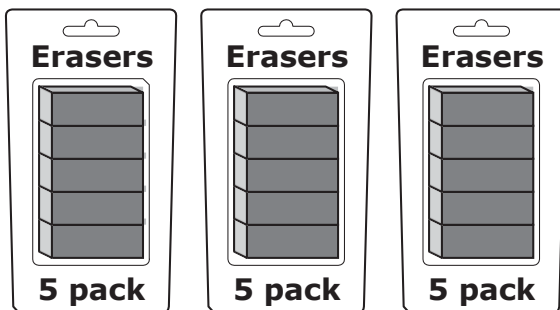
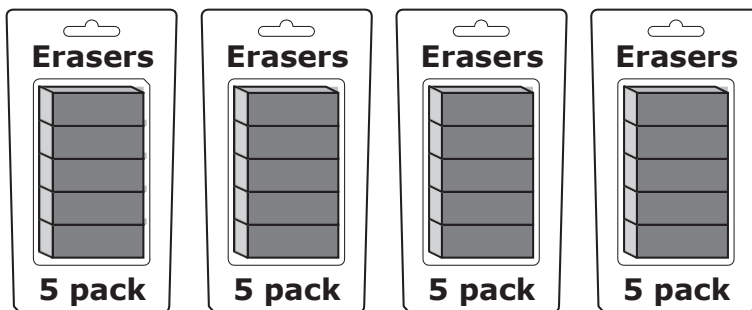
Standard Text: Interpret the factors and products in whole number multiplication equations (e.g., 4×7 is 4 groups of 7 objects with a total of 28 objects or 4 strings measuring 7 inches each with a total of 28 inches.)

Calculator: Y

Correct Answer: C

Susan is buying erasers for her class of 20 students at school. Each pack contains 5 erasers. Each student will receive one eraser.

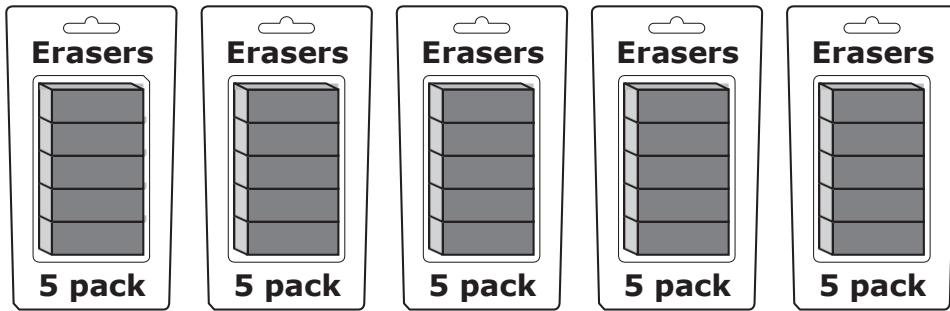
Which picture shows how many packs of 5 erasers Susan needs to buy?

A.**B.****C.**

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(Item 20, continued from the previous page)

D.



Rationales	
Incorrect – 1	Students likely interpreted only the part of the situation that said each pack contains 5 erasers and selected the option that showed a single pack. Students did not process the information about the need for 20 erasers as needing multiple packs of 5. Students may need additional support identifying all of the important information in a contextual problem and then checking that all of the information has been used in determining a final answer.
Incorrect – 2	Students may have interpreted the situation to be asking how many additional sets of 5 are needed to make 20 when added to the 5 identified in the problem, finding that $20 - 5 = 15$ and then selecting the option showing a total of 15 erasers. Students may need additional support interpreting a problem situation to identify what is known about each given value and then determining how to use the values appropriately.
Correct – 3	Students correctly determined that 4 packs of erasers are necessary to distribute 20 erasers with 5 in each pack to students because $4 \times 5 = 20$. This item required students to interpret factors and products in a contextual problem solved using a whole-number multiplication equation.
Incorrect – 4	Students likely added the 20 and 5 given in the problem and did not understand the multiplicative relationship in the situation. Since $20 + 5 = 25$, students then selected the option showing a total of 25 erasers. Students may need additional support in reading and then modeling (e.g. physically, verbally, pictorially) problem situations to ensure understanding of the question being asked.

Item Information

Item Code: TN622511

Grade Level: 3

Standard Code: 3.NF.A.3.d

Position No: 21

Standard Text: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Use the symbols $>$, $=$, or $<$ to show the relationship and justify the conclusions.

Calculator: Y

Correct Answer: B,C,E

A comparison is shown.

$$\frac{5}{8} < \square$$

Choose the **three** fractions that will make the comparison true.

A. $\frac{1}{8}$

B. $\frac{5}{1}$

C. $\frac{5}{6}$

D. $\frac{5}{8}$

E. $\frac{6}{8}$

Rationales	
Incorrect – 1	Students may have confused the “less than” symbol with the symbol for “greater than” symbol. Students may need additional practice in reading inequalities from left to right out loud and support in checking for accuracy in symbol identification.
Correct – 2	Students correctly determined that $\frac{5}{1}$ is greater than $\frac{5}{8}$. This item required students to compare two fractions with the same numerator or the same denominator by reasoning about their size and using symbols ($>$, $<$, $=$) to justify their comparison.
Correct – 3	Students correctly determined that $\frac{5}{6}$ is greater than $\frac{5}{8}$. This item required students to compare two fractions with the same numerator or the same denominator by reasoning about their size and using symbols ($>$, $<$, $=$) to justify their comparison.
Incorrect – 4	Students may have disregarded or misread the “less than” symbol and selected a fraction equal to $\frac{5}{8}$. Students may need practice in reading inequalities from left to right out loud and support in checking for accuracy in symbol identification.
Correct – 5	Students correctly determined that $\frac{6}{8}$ is greater than $\frac{5}{8}$. This item required students to compare two fractions with the same numerator or the same denominator by reasoning about their size and using symbols ($>$, $<$, $=$) to justify their comparison.

Item Information

Item Code: TN432452

Grade Level: 3

Standard Code: 3.MD.D.8

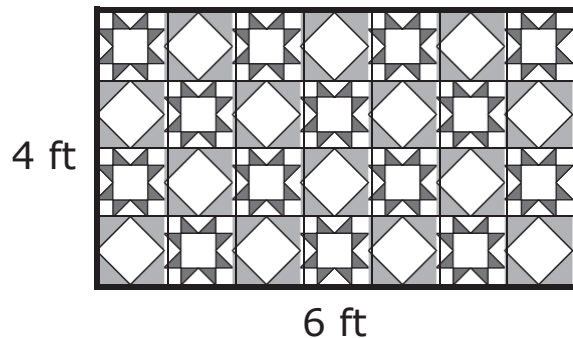
Position No: 22

Standard Text: Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

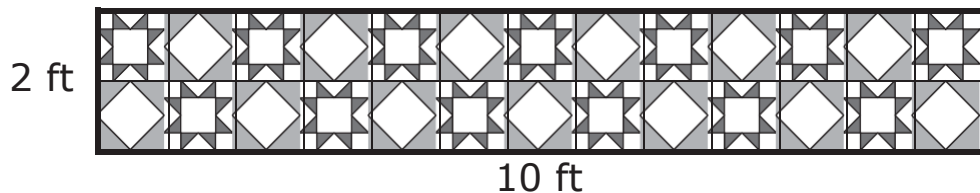
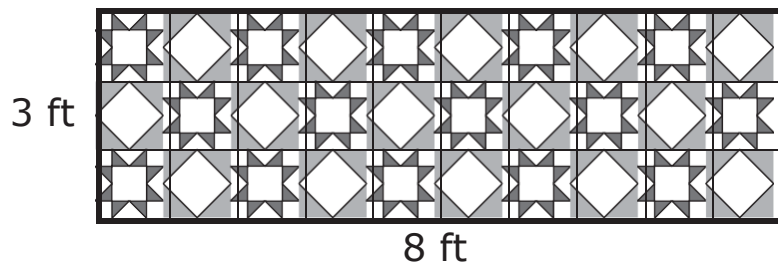
Calculator: Y

Correct Answer: D

Nick has 2 blankets that have the same perimeter but different areas. One blanket is shown.



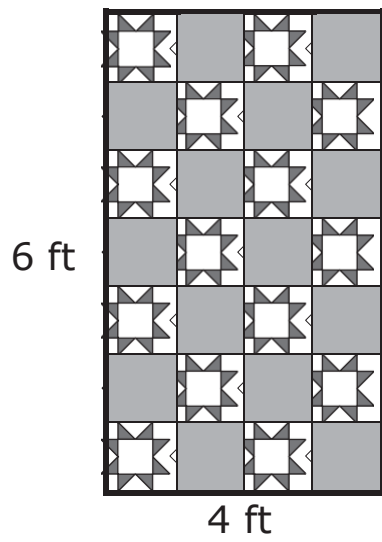
Which blanket could be Nick's other blanket?

A.**B.**

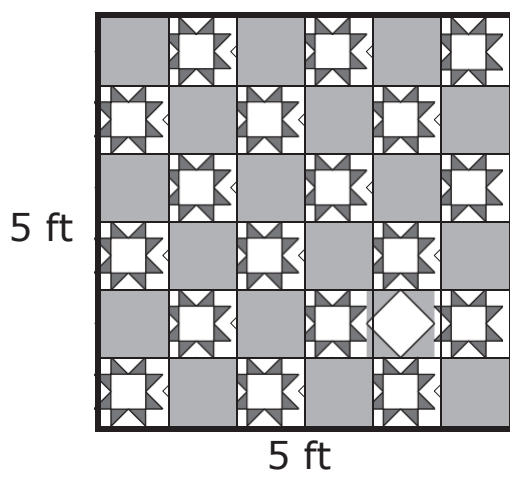
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(**Item 22**, continued from the previous page)

C.



D.



Rationales	
Incorrect – 1	Students did correctly identify a blanket that has a different area (20 square feet rather than 24 square feet) but then did not correctly calculate and compare perimeters of the blankets ($4 + 6 + 4 + 6$ is 20 while $2 + 10 + 2 + 10$ is 24). Students may need additional support in identifying all the important information in a contextual problem and then checking that their work uses all the information correctly and fully answers the question asked.
Incorrect – 2	Students likely compared 4×6 to 3×8 to find that both blankets had a common trait but confused area and perimeter. For this reason, students identified blankets with the same area but different perimeters instead of blankets with the same perimeter but different areas. Students may need additional support in distinguishing concepts of perimeter and area and the formulas used to calculate them.
Incorrect – 3	Students likely found a blanket with the same dimensions as the given blanket, recognizing that the figure is the same but in a different orientation. Students may need support in reading and modeling with contextual problems to identify whether the student understands concepts of perimeter and area and is hindered by the reading and understanding of the problem itself.
Correct – 4	Students correctly identified first that the blanket has a perimeter of 20 because each side length is 5 feet and $5 + 5 + 5 + 5 = 5 \times 4 = 20$, but then also determined that it has a different area because the area is 5×5 or 25 square feet. This item required students to solve a real-world problem by finding the perimeters and areas of rectangles and then comparing those perimeters and areas to determine a final answer.

Item Information

Item Code: TN952322

Grade Level: 3

Standard Code: 3.OA.A.2

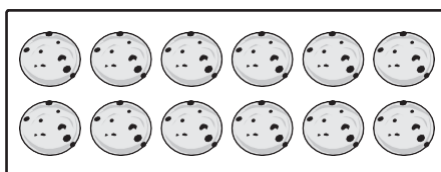
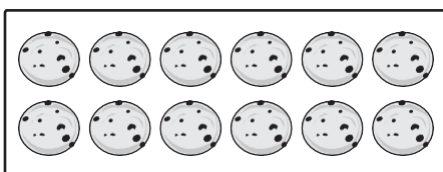
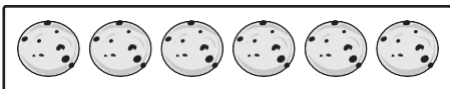
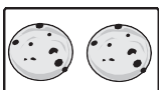
Position No: 23

Standard Text: Interpret the dividend, divisor, and quotient in whole number division equations (e.g., $28 \div 7$ can be interpreted as 28 objects divided into 7 equal groups with 4 objects in each group or 28 objects divided so there are 7 objects in each of the 4 equal groups).

Calculator: Y

Correct Answer: B

Which picture shows $12 \div 6$?

A.**B.****C.****D.**

Rationales	
Incorrect – 1	Students identified groups of 12 cookies in rows of 6 as representing $12 \div 6$, disregarding that the model, as a whole, represented a total of 24 cookies rather than 12. Students may need support in attending to a model as a whole and not only the individual parts of the model.
Correct – 2	Students correctly identified the picture depicting 12 cookies evenly divided into groups of 6 cookies ($12 \div 6 = 2$). This item required students to identify a model representing a division expression.
Incorrect – 3	Students may have selected a model that represented the total of 6 cookies divided equally, misinterpreting the meaning of " $\div 6$ " in the given expression. Students may need support in reading and interpreting the meaning of an entire expression.
Incorrect – 4	Students likely recognized that $12 \div 6 = 2$ and then selected an option that showed groups of 2 cookies. Students may need support in understanding what is being asked in a problem rather than identifying computations in the context of the problem and then solving them without regard for the question asked.

Item Information

Item Code: TN321818

Grade Level: 3

Standard Code: 3.OA.A.3

Position No: 24

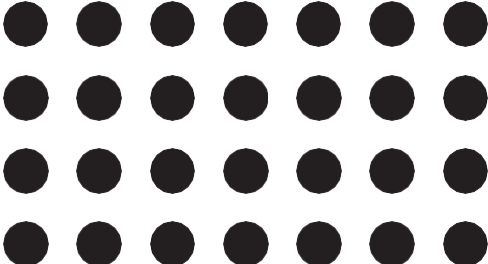
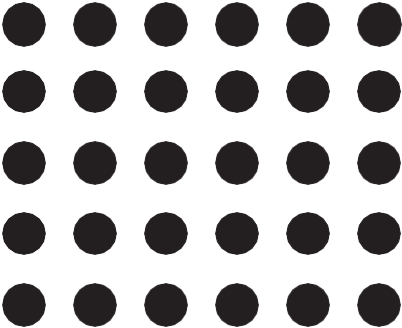
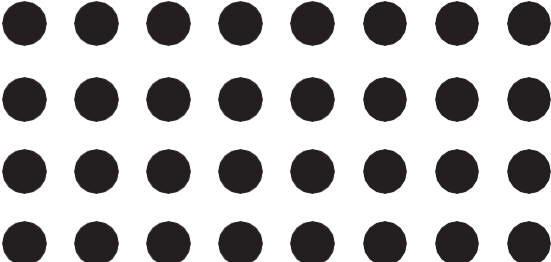
Standard Text: Multiply and divide within 100 to solve contextual problems, with unknowns in all positions, in situations involving equal groups, arrays, and measurement quantities using strategies based on place value, the properties of operations, and the relationship between multiplication and division (e.g., contexts including computations such as $3 \times ? = 24$, $6 \times 16 = ?$, $? \div 8 = 3$, or $96 \div 6 = ?$)

Calculator: Y

Correct Answer: C

Liz is helping her teacher set up 32 chairs for the class play.

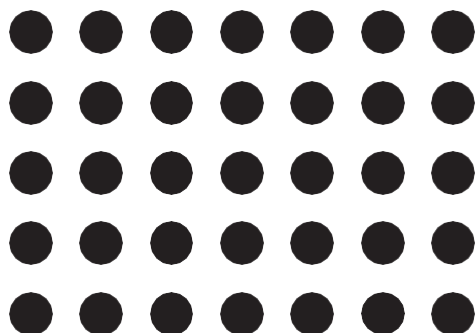
Which array shows one way Liz can set up all the chairs?

- A.** 
- B.** 
- C.** 

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(Item 24, continued from the previous page)

D.



Rationales	
Incorrect – 1	Students likely miscounted the number of columns in the array or miscounted the total number of circles. Students may need additional support in attending carefully to numbers of rows and columns in arrays and in keeping track of their counting a total.
Incorrect – 2	Students likely miscounted the total number of circles in the array (counting as 32 instead of 30) or recalled a multiplication fact incorrectly. Students may need additional support in carefully keeping track of their counting a total and in building fluency with multiplication facts.
Correct – 3	Students correctly identified an array to represent a product of 32 as 4 rows of 8 or 8 columns of 4. This item required students to use equal groups and arrays to multiply and divide within 100 to solve a contextual problem.
Incorrect – 4	Students likely miscounted the total number of circles in the array (counting as 32 instead of 35) or recalled a multiplication fact incorrectly. Students may need additional support in carefully keeping track of their counting a total and in building fluency with multiplication facts.

Additional Resources

- [Information on Tennessee's Assessment Program](#)
- [Tennessee Academic Standards for Mathematics](#)
- [The eight Standards for Mathematical Practice](#)
- [Best for All Central](#)
- [Assessing Student Learning Reopening Toolkit](#)
- [Assessment Development LiveBinder Resource Site](#)

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