Checkpoint Results Interpretation Guide

Grade 4 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 experts[1], 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 4 Math Checkpoint should be given to incoming fifth grade students to help plan for students learning grade 5 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:	The Checkpoint IS NOT:
• 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	• a replacement for the performance level determinaions a student would have received on the TCAP assessment • predictive of, or comparable to, summative TCAP results • a replacement for RTI[2] 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

"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"

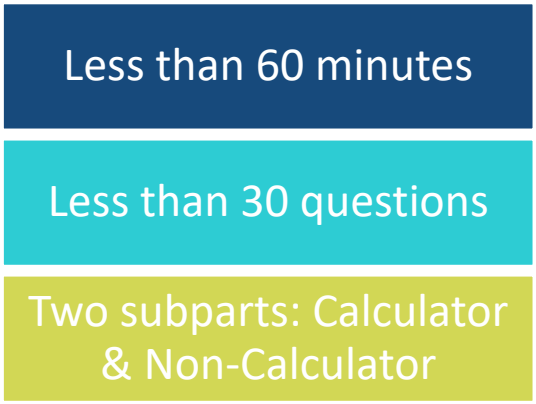
-Commissioner Penny Schwinn

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



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 – 56%**	**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	**57 – 74%**	**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	**75 – 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.

Item 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 multiplicator (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 4 Math Checkpoint Item Annotations

Item Information

Item Code: TN682435 Grade Level: 4

Standard Code: 4.NBT.B.5 Position No: 1

Standard Text: Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Calculator: N

Correct Answer: C

What is $2{,}815 \times 7$?

A. 19,635

B. 19,645

C. 19,705

D. 19,885

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 multiplicator (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.

Item Information

Item Code: TN232710 Grade Level: 4

Standard Code: 4.OA.A.3 Position No: 2

Standard Text: Solve multi-step contextual problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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: A

Ben had 5 sheets of stickers.

- Each sheet had 12 stickers on it.
- Ben gave 23 stickers to his sister.
- He gave 16 stickers to his brother.

Which equation can be used to determine s, how many stickers Ben has left?

A. $(5 \times 12) - 23 - 16 = s$

B. $(12 + 5) - 23 + 16 = s$

C. $(5 \times 12) - 23 + 16 = s$

D. $(12 \times 5) + 23 - 16 = s$

Rationales	
Correct – 1	This problem requires students to determine an equation that could be used to solve a multi-step contextual problem when the unknown quantity is defined. To determine the number of tickets Ben has left, students should have represented the number of stickers Ben started with as (5×12) and then subtracted the numbers of stickers he gave away, resulting in $(5 \times 12) - 23 - 16 = s$.
Incorrect – 2	Students choosing this answer likely understood that the 5 and 12 were both referring to the original stickers Ben had; however, they added the two numbers instead of multiplying them. In addition, students correctly represented the 23 stickers given away with subtraction, but represented the 16 stickers given away as an addition step. Students choosing this answer may need support in identifying the meaning of each value in a contextual problem and articulating how to use each value in determining a final answer.
Incorrect – 3	Students choosing this answer understood how to find the total number of stickers Ben started with but misinterpreted one instance of giving stickers away as an addition step rather than a subtraction step because 23 and 16 could be added together and then subtracted, but showing this would require parentheses around the addition step. Students choosing this answer may need support in understanding how computations are performed when parentheses are present and when they are not present.
Incorrect – 4	Students choosing this answer understood how to find the total number of stickers Ben started with but misinterpreted one instance of giving stickers away as an addition step rather than a subtraction step. Students choosing this answer may need support in identifying the meaning of each value in a contextual problem and articulating how to use each value in determining a final answer.

Item Information

Item Code:	TN933009	Grade Level:	4
Standard Code:	4.NBT.B.5	Position No:	3
Standard Text:	Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.		
Calculator:	N		
Correct Answer:	B,C,E		

Which expressions have a product of 400? Choose the **three** correct answers.

A. 30×12

B. 20×20

C. 25×16

D. 14×14

E. 40×10

Rationales	
Incorrect – 1	Students choosing this answer may have added 3 and 1 before multiplying 3 and 1. Students choosing this answer may need additional support in multiplying two two-digit numbers and using strategies based on place value and the properties of operations.
Correct – 2	This problem requires students to multiply two two-digit numbers using strategies based on place value and the properties of operations.
Correct – 3	This problem requires students to multiply two two-digit numbers using strategies based on place value and the properties of operations.
Incorrect – 4	Students choosing this answer may have made regrouping, alignment, and order of operation errors. Students choosing this answer may need additional support in working through an appropriate algorithm step by step and accounting for each value and the operation that should be made with it.
Correct – 5	This problem requires students to multiply two two-digit numbers using strategies based on place value and the properties of operations.

Item Information

Item Code:	TN175096	Grade Level:	4
Standard Code:	4.NF.B.3.b	Position No:	4

Standard Text: Decompose a fraction into a sum of fractions with the same denominator in more than one way (e.g. 3/8 = 1/8 + 1/8 + 1/8; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8), recording each decomposition by an equation. Justify decompositions by using a visual fraction model.

Calculator: N

Correct Answer: C

Which equation is **true**?

A. $2\frac{3}{8} = \frac{2}{8} + \frac{3}{8}$

B. $2\frac{3}{8} = \frac{8}{8} + \frac{3}{8}$

C. $2\frac{3}{8} = \frac{8}{8} + \frac{8}{8} + \frac{3}{8}$

D. $2\frac{3}{8} = 8 + 8 + \frac{3}{8}$

Rationales	
Incorrect – 1	Student choosing this answer likely represented the whole number 2 as 2/8 Students choosing this answer may need additional support decomposing whole numbers into equivalent fractions.
Incorrect – 2	Student choosing this answer likely understood that a whole number can be represented in fraction form but used a form equivalent to 1 rather than 2. Students choosing this answer may need additional support decomposing whole numbers greater than 1 into equivalent fractions and sums of fractions.
Correct – 3	This problem requires students to correctly decompose a fraction into a sum of fractions. Students decomposed the whole number 2 as 8/8 + 8/8 and then added the 3/8
Incorrect – 4	Student choosing this answer likely represented the whole number 2 as 8 ones and 8 ones instead of as 8/8 + 8/8. Students choosing this answer may need additional support representing whole numbers as equivalent fractions.

Item Information

Item Code: TN032464 Grade Level: 4

Standard Code: 4.OA.A.1 Position No: 5

Standard Text: Interpret a multiplication equation as a comparison (e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5). Represent verbal statements of multiplicative comparisons as multiplication equations.

Calculator: N

Correct Answer: D

Read this sentence.

18 is 2 times as many as an unknown number.

Which equation can be used to find the unknown number?

A. $18 \times \square = 2 \times \square$

B. $2 = 18 \times \square$

C. $\square = 2 \times 18$

D. $18 = 2 \times \square$

Rationales	
Incorrect – 1	Students choosing this answer correctly represented "2 times as many as an unknown number" but represented "18 is" as another multiplication step. Students choosing this answer may need additional support in interpreting and representing verbal statements indicating equality.
Incorrect – 2	Students choosing this answer correctly represented "an unknown number" as a [box], but interpreted "18 is" as 18 × and "two times as many as" as 2 =. Students choosing this answer may need additional support in interpreting and representing verbal statements of multiplicative comparisons and statements indicating equality.
Incorrect – 3	Students choosing this answer likely represented "18 is 2 times as many" to mean 2 × 18. Students choosing this answer may need additional support in interpreting and representing verbal statements of multiplicative comparisons.
Correct – 4	This problem requires students to interpret and represent verbal statements of multiplicative comparisons as multiplication equations. Students correctly interpreted "18 is" as 18 = , "2 times as many as" as 2 ×, and "an unknown number" as an empty box.

Item Information

Item Code: TN452889 Grade Level: 4

Standard Code: 4.NF.B.4.c Position No: 6

Standard Text: Solve contextual problems involving multiplication of a whole number by a fraction (e.g., by using visual fraction models and equations to represent the problem).

Calculator: N

Correct Answer: D

Lee ran $\frac{5}{3}$ miles each day for 4 days.

How many miles did Lee run during the 4 days?

A. $\frac{5}{12}$

B. $\frac{20}{12}$

C. $\frac{9}{3}$

D. $\frac{20}{3}$

Rationales	
Incorrect – 1	Students choosing this answer likely converted the 4 into the fraction 1/4 instead of 4/1 before multiplying. This could indicate interpreting the situation as one requiring division instead of multiplication or an error in handling a whole number conversion. Students choosing this answer may need additional support in interpreting contextual problems involving and converting whole numbers into equivalent fractions.
Incorrect – 2	Students choosing this answer likely multiplied the fraction 5/3 by 4/4 instead of by 4/1. Students choosing this answer may need additional support in converting whole numbers into equivalent fractions.
Incorrect – 3	Students choosing this answer likely added the numerator 4 to the numerator of the fraction 5/3. Students choosing this answer may need additional support in interpreting contextual problems and articulating the computations necessary for solving them.
Correct – 4	This problem requires students to interpret and represent verbal statements of multiplicative comparisons as multiplication equations. Students correctly interpreted "18 is" as 18 = , "2 times as many as" as 2 ×, and "an unknown number" as an empty box.

Item Information

Item Code: TN012466 Grade Level: 4

Standard Code: 4.OA.A.2 Position No: 7

Standard Text: Multiply or divide to solve contextual problems involving multiplicative comparison, and distinguish multiplicative comparison from additive comparison.

Calculator: N

Correct Answer: A

There are 24 books on the bottom shelf of a bookcase. That is 3 times as many books as are on the top shelf of the bookcase.

How many books are on the top shelf?

A. 8

B. 16

C. 21

D. 72

Rationales	
Correct – 1	This problem requires students to multiply or divide to solve a contextual problem involving multiplicative comparison. To find the total number of books on the top shelf, students correctly interpreted the situation and determined that 24 is 3 times as many as 8.
Incorrect – 2	Students choosing this answer likely understood that 24 is 3 times as many as 8 but then subtracted 8 from 24. Students choosing this answer may need additional support interpreting a contextual problem.
Incorrect – 3	Students choosing this answer likely subtracted the 3 from 24. Students choosing this answer may need additional support interpreting a multiplicative comparison in context.
Incorrect – 4	Students choosing this answer likely understood that a multiplicative relationship was described but multiplied 24 by 3 instead of finding how many times 3 makes 24. Students choosing this answer may need additional support interpreting the meaning of a multiplicative comparison in relation to the values used in a contextual problem.

Item Information

Item Code: TN102417 Grade Level: 4

Standard Code: 4.NF.B.3.a Position No: 8

Standard Text: Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

Calculator: N

Correct Answer: D

Jeff planted all the seeds from a bag of flower seeds. He planted some of the seeds on Monday and all the remaining seeds on Tuesday.

Which pair of fractions could describe the fraction of the bag of seeds that Jeff planted each day?

A. $\frac{1}{3}$ on Monday and $\frac{1}{3}$ on Tuesday

B. $\frac{1}{5}$ on Monday and $\frac{2}{5}$ on Tuesday

C. $\frac{3}{8}$ on Monday and $\frac{7}{8}$ on Tuesday

D. $\frac{5}{12}$ on Monday and $\frac{7}{12}$ on Tuesday

Rationales	
Incorrect – 1	Students choosing this answer may have interpreted "some of the seeds on Monday and all of the remaining seeds on Tuesday" as two equal amounts and did not understand that the fractions needed to have a sum equivalent to 1 whole. Students choosing this answer may need additional support in interpreting a contextual problem with particular attention to what constitutes one whole.
Incorrect – 2	Students choosing this answer may have interpreted "some of the seeds on Monday" as a unit fraction portion and "all the remaining seeds" as a larger portion and did not understand that the fractions needed to have a sum equivalent to 1 whole. Students choosing this answer may need additional support in interpreting a contextual problem with particular attention to what constitutes one whole.
Incorrect – 3	Students choosing this answer may have interpreted "some of the seeds on Monday and all of the remaining seeds on Tuesday" as two unequal amounts and did not understand that the fractions needed to have a sum equivalent to 1 whole. Students choosing this answer may need additional support in interpreting a contextual problem with particular attention to what constitutes one whole.
Correct – 4	This problem requires students to represent addition and subtraction of fractions as joining and separating parts referring to the same whole. To determine which pair of fractions could describe the fraction of the bag of seeds that Jeff planted each day, students identified fractions that have a sum that is equivalent to 1 whole.

Item Information

Item Code: TN032953 Grade Level: 4

Standard Code: 4.NF.B.3.b Position No: 9

Standard Text: Decompose a fraction into a sum of fractions with the same denominator in more than one way (e.g. 3/8 = 1/8 + 1/8 + 1/8; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8), recording each decomposition by an equation. Justify decompositions by using a visual fraction model.

Calculator: N

Correct Answer: A,B,E

Which expressions have the same value as $\frac{7}{4}$? Choose the **three** correct answers.

A. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$

B. $\frac{2}{4} + \frac{2}{4} + \frac{2}{4} + \frac{1}{4}$

C. $\frac{4}{2} + \frac{3}{2}$

D. $\frac{3}{4} + \frac{3}{4} + \frac{2}{4}$

E. $1 + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$

Rationales	
Correct – 1	This problem requires students to decompose a fraction into a sum of fractions with the same denominator in more than one way. Students selecting this option correctly determined that 1/4 +1/4 +1/4 +1/4 + 1/4 + 1/4 + 1/4 is equivalent to 7/4
Correct – 2	This problem requires students to decompose a fraction into a sum of fractions with the same denominator in more than one way. Students selecting this option correctly determined that 2/4 + 2/4 + 2/4 + 1/4 is equivalent to 7/4
Incorrect – 3	Students choosing this answer likely decomposed the numerator 7 into 4 + 3 but also decomposed the denominator 4 into 2 + 2. Students choosing this answer may need additional support in using concrete models of fractions with a numerator greater than 1 and then identifying sums that can be made when looking at the fractional parts decomposed in various ways.
Incorrect – 4	Students choosing this answer likely made a calculation error and decomposed 7 into 3 + 3 + 2 while preserving the correct denominator. Students choosing this answer may need additional support in checking and correcting their computations.
Correct – 5	This problem requires students to decompose a fraction into a sum of fractions with the same denominator in more than one way. Students selecting this option correctly determined that 1+ 1/4 + 1/4 + 1/4 is equivalent to 7/4

Item Information

Item Code: TN932895 Grade Level: 4

Standard Code: 4.NF.C.5 Position No: 10

Standard Text: Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.

Calculator: N

Correct Answer: A

Which number sentence is **true**?

A. $\frac{2}{10} + \frac{6}{100} = \frac{26}{100}$

B. $\frac{6}{10} + \frac{7}{100} = \frac{76}{100}$

C. $\frac{4}{10} + \frac{5}{100} = \frac{45}{10}$

D. $\frac{5}{10} + \frac{6}{100} = \frac{65}{10}$

Rationales	
Correct – 1	This problem requires students to express a fraction with denominator of 10 as an equivalent fraction with denominator of 100 for the purpose of finding the sum of the fractions. Students correctly converted 2/10 to 20/100 and identified the sum as correct.
Incorrect – 2	Students choosing this answer likely converted the fraction that did not require a conversion because it already had the same denominator as the sum. Then they added 70 and 6 and disregarded that the denominators were not the same. Students choosing this answer may need additional support in understanding that two fractions must have the same denominator before they can be added together so that they refer to the same whole.
Incorrect – 3	Students choosing this answer understood how to convert the numerator of 4/10 but then did not apply the same factor to the denominator of 10 to convert it to 100. Students choosing this answer may need additional support in understanding that converting fractions to equivalent fractions requires multiplying both the numerator and the denominator by the same number so that the multiplication is the same as multiplying by 1.
Incorrect – 4	Students choosing this answer may have used a 0 from the denominator of 6/100 to convert it to 60/10. Students choosing this answer may need additional support in understanding equivalent fractions and how to generate them.

Item Information

Item Code: TN826697 Grade Level: 4

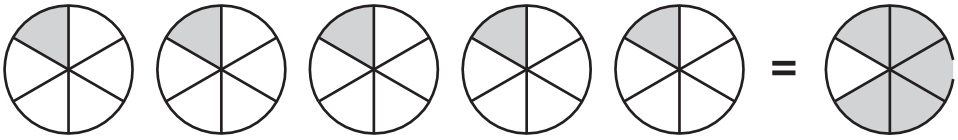
Standard Code: 4.NF.B.4.a Position No: 11

Standard Text: Understand a fraction a/b as a multiple of 1/b.

Calculator: N

Correct Answer: A

Look at the fraction model.



Which equation could the model represent?

A. $5 \times \frac{1}{6} = \frac{5}{6}$

B. $6 \times \frac{1}{5} = \frac{6}{30}$

C. $5 \times \frac{1}{6} = \frac{6}{5}$

D. $6 \times \frac{1}{5} = \frac{5}{30}$

Rationales	
Correct – 1	This problem requires students to understand a fraction as a multiple of unit fractions. To determine the equation that could represent the given model, students determined that there is a total of 5 shaded portions each equal to $\frac{1}{6}$ and selected an equation which modeled this relationship.
Incorrect – 2	Students choosing this answer likely identified each of the 5 shaded portions of the model as $\frac{1}{5}$ and then used the total number of shaded models as a whole number multiplier (6). Students choosing this answer may need additional support in understanding the meaning of the numerator and the denominator in a fraction.
Incorrect – 3	Students choosing this answer correctly determined that there is a total of 5 shaded portions each equal to $\frac{1}{6}$ but then did not understand how to multiply a whole number by a fraction. Students choosing this answer may need additional support in relating multiplication of a fraction by a whole number to repeated addition with the fraction for the purpose of relating the sum to the correct product.
Incorrect – 4	Students choosing this answer may have identified each shaded portion of the model as $\frac{1}{5}$ instead of $\frac{1}{6}$ and then used the total number of pieces as a multiplier. In addition, students multiplied the 6 by the denominator instead the numerator for an incorrect product. Students choosing this answer may need additional support in understanding the meaning of the numerator and the denominator in a fraction and in converting whole numbers into fractions with a denominator of 1.

Item Information

Item Code: TN533197 Grade Level: 4

Standard Code: 4.NF.C.6 Position No: 12

Standard Text: Read and write decimal notation for fractions with denominators 10 or 100. Locate these decimals on a number line.

Calculator: N

Correct Answer: B,D

Which fractions have the same value as 0.6? Choose the **two** correct answers.

A. $\frac{6}{100}$

B. $\frac{6}{10}$

C. $\frac{60}{10}$

D. $\frac{60}{100}$

E. $\frac{600}{100}$

Rationales	
Incorrect – 1	Students choosing this answer likely misread the decimal number as 6 hundredths instead of 6 tenths, and then selected the fraction 6/100. Students choosing this answer may need additional support in reading and writing decimal numbers based on place value of digits.
Correct – 2	This problem requires students to determine fractions that are equivalent to decimal numbers. To determine the correct answers, students should have read the given decimal number as six tenths and then looked for fractions that are equivalent to six tenths, in this case, an exact match to the option 6/10.
Incorrect – 3	Students choosing this answer likely read the decimal number correctly as 6 tenths and then selected the fraction 60/10 because of the common denominator. Students choosing this answer may need additional support in understanding that converting a fraction to an equivalent fraction results in a change to both the numerator and the denominator.
Correct – 4	This problem requires students to determine fractions that are equivalent to decimal numbers. To determine the correct answers, students should have read the given decimal number as six tenths and then looked for fractions that are equivalent to six tenths, in this case, converting 6/10 to an equivalent fraction 60/100 by either considering the decimal number of 0.6 as 0.60 or by multiplying 6/10 by 10/10, a fraction equal to 1.
Incorrect – 5	Students choosing this answer likely understood that decimal numbers representing a fraction with a denominator of 10 can be converted to a fraction with a denominator of 100. They made an error in changing the numerator, however, converting it to 600 instead of 60. Students choosing this answer may need support with how to calculate equivalent fractions by applying the same multiplication or division to both numerator and denominator.

Item Information

Item Code: TN132851 Grade Level: 4

Standard Code: 4.NF.B.4.a Position No: 13

Standard Text: Understand a fraction a/b as a multiple of 1/b.

Calculator: N

Correct Answer: A

Which expression shows another way to represent $\frac{2}{6}$?

A. $2 \times \frac{1}{6}$

B. $2 + \frac{1}{6}$

C. $6 \times \frac{1}{2}$

D. $6 + \frac{1}{2}$

Rationales	
Correct – 1	This problem requires students to determine a way to express the fraction 2/6 as an expression. To determine the correct answer, students should have considered the ways that 2/6 can be decomposed. One way to express it is 1/6 + 1/6, which is equivalent to 2 × 1/6.
Incorrect – 2	Students choosing this answer likely misinterpreted 2 + 1/6 to mean the same as 1/6 + 1/6. Students choosing this answer may need support in modeling computations to understand their meaning. For example, modeling 2 wholes plus 1/6 of another whole would help students recognize that the results is much greater than 2/6.
Incorrect – 3	Students choosing this answer likely understood that multiplication could be used to represent the fraction but used the values 2 and 6 in incorrect places. Students choosing this answer may need support in decomposing fractions using concrete models and then articulating different ways of describing the fractions represented by using addition or multiplication concepts.
Incorrect – 4	Students choosing this answer likely misinterpreted 2 + 1/6 to mean the same as 1/6 + 1/6 and then used the values 2 and 6 in incorrect places. Students choosing this answer may need support in decomposing fractions using concrete models and then articulating different ways of describing the fractions represented by using addition or multiplication concepts.

Item Information

Item Code: TN752428 Grade Level: 4

Standard Code: 4.NF.B.3.d Position No: 14

Standard Text: Solve contextual problems involving addition and subtraction of fractions referring to the same whole and having like denominators.

Calculator: Y

Correct Answer: A

Sally uses tickets for rides, games, and food at a carnival.

- She uses $\frac{3}{8}$ of her tickets for rides.
- She uses $\frac{3}{8}$ of her tickets for games.

What fraction of her tickets does Sally have remaining for food?

A. $\frac{2}{8}$

B. $\frac{3}{8}$

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

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

Rationales	
Correct – 1	This problem requires students to interpret a contextual problem and then solve it using addition and subtraction with fractions. To determine the correct answer, students should have reasoned that the fractions of tickets Sally used should be combined, and then the combined amount should be removed from the "1 whole" set of tickets she had to start with, calculating 3/8 + 3/8 = 6/8, then 1 – 6/8 = 8/8 – 6/8 = 2/8.
Incorrect – 2	Students choosing this answer likely did not understand how to find the "1 whole" in this context. They may then have assumed that since Sally used 3/8 of her tickets for rides and another 3/8 for games, she may have used another 3/8 for food. Students choosing this answer may need support in interpreting a situation and identifying what the "1 whole" is in the context.
Incorrect – 3	Students choosing this answer likely subtracted 3/8 from 1 or 8/8, accounting only for one of the ways Sally used tickets. Students choosing this answer may need support in attending to all parts of a contextual problem and articulating the steps they should perform to fully answer the question asked.
Incorrect – 4	Students choosing this answer likely added the fractions of the tickets Sally used and then did not know how to determine the "1 whole" to use to find the fraction of tickets remaining. Students choosing this answer may need support in interpreting a situation and identifying what the "1 whole" is in the context.

Item Information

Item Code: TN132655 Grade Level: 4

Standard Code: 4.OA.A.3 Position No: 15

Standard Text: Solve multi-step contextual problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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: B

A florist is placing flowers into vases.

- There are 14 boxes of flowers.
- Each box contains 12 flowers.
- All of the flowers are shared equally among 8 vases.

How many flowers are in each vase?

A. 3

B. 21

C. 168

D. 1344

Rationales	
Incorrect – 1	Students choosing this answer likely added 14 and 12 to get 26 rather than multiplying. They then divided 26 by 8 and disregarded the remainder. This indicates that the students interpreted the 14 in the context as individual flowers rather than boxes of flowers. Students choosing this answer may need support in identifying the meaning of each value in a contextual problem and articulating how operations describe the relationship between each value.
Correct – 2	This problem requires students to interpret a contextual problem and then solve it using multiple steps and operations. To determine the correct answer, students should have reasoned that the total number of flowers should be found before they could be shared or divided among the vases, calculating $14 \times 12 = 168$. Then this total should be divided among the vases, $168 \div 8 = 21$.
Incorrect – 3	Students choosing this answer likely completed only one of the two steps needed to solve the problem, determining the total number of flowers as $14 \times 12 = 168$. Students choosing this answer may need support in attending to all parts of a contextual problem and articulating the numeric relationships connected to the information provided and information needed in real-world problems across single-step and multiple-step scenarios to fully answer the question asked.
Incorrect – 4	Students choosing this answer likely found the product of all the values in the problem, calculating $14 \times 12 \times 8 = 1{,}344$. This indicates that the students interpreted the sharing of the flowers among vases as requiring multiplication rather than division. Students choosing this answer may need support in distinguishing between multiplication and division contexts including modeling (e.g. physically, verbally, pictorially), such as equal sharing with concrete objects, as an example.

Item Information

Item Code: TN822459 Grade Level: 4

Standard Code: 4.NBT.B.6 Position No: 16

Standard Text: Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Calculator: Y

Correct Answer: B

Joan has 438 treats. She will make bags of treats by putting 5 treats in each bag. Joan divides 438 by 5. She thinks she will be able to make 87 bags of treats with 3 treats remaining.

Which steps could Joan use to check her division?

A. multiply 87×3, then add 5 to the result

B. multiply 87×5, then add 3 to the result

C. multiply 87×3, then subtract 5 from the result

D. multiply 87×5, then subtract 3 from the result

Rationales	
Incorrect – 1	Students choosing this answer likely used the divisor of 5 and the remainder of 3 in the wrong places when reversing the operations. They multiplied the quotient 87 by the remainder of 3 instead of by the divisor of 5. Students choosing this answer may need support in using inverse operations to check division that results in answers without remainders and division that results in answers with remainders to distinguish how the remainders are used in checking answers.
Correct – 2	This problem requires students to explain how to check the answer to a division problem when the quotient has a remainder by using the inverse operation of multiplication and accounting for the remainder. To determine the correct answer, students should have reasoned that Joan found that $483 \div 5 = 87$ remainder 3. Using the inverse operation of multiplication, the quotient of 87 would be multiplied by the divisor of 5, and then the remainder that could not be divided before gets added back in, meaning $(87 \times 5) + 3$ should be used to check the division.
Incorrect – 3	Students choosing this answer likely used the divisor of 5 and the remainder of 3 in the wrong places when reversing the operations and used the incorrect operation when trying to reverse the step that resulted in a remainder. They multiplied the quotient 87 by the remainder of 3 instead of by the divisor of 5. They also did not recognize that the step in long division which results in a remainder is a subtraction step using the inverse operation of addition when checking the answer. Students choosing this answer may need support in using inverse operations to check division that results in answers without remainders and division that results in answers with remainders to distinguish how the remainders are used in checking answers. Students may also benefit from articulating how a remainder is found and then how to use an inverse operation to add a remainder back into a total.
Incorrect – 4	Students choosing this answer likely did not recognize that the step in long division which results in a remainder is a subtraction step, so to reverse that step to check an answer, the inverse operation of addition should be used. Students choosing this answer may need support in articulating how a remainder is found and then how to use an inverse operation to add a remainder back into a total.

Item Information

Item Code: TN236535 Grade Level: 4

Standard Code: 4.NF.B.4.a Position No: 17

Standard Text: Understand a fraction a/b as a multiple of 1/b.

Calculator: Y

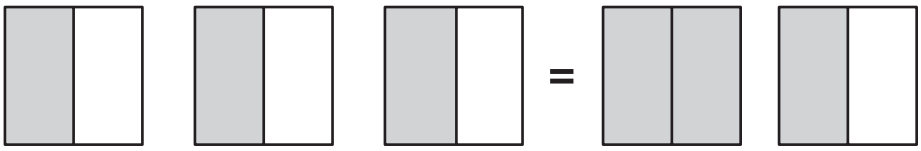
Correct Answer: D

Here is an equation.

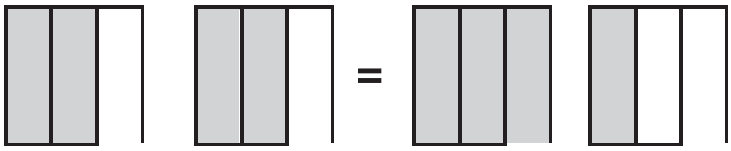
$$2 \times \frac{1}{3} = \frac{2}{3}$$

Which fraction model represents the equation?

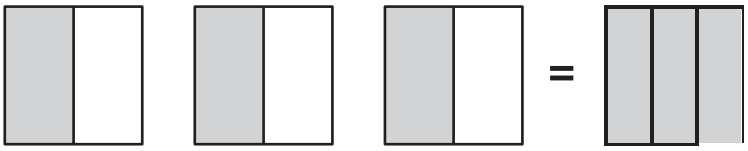
A.



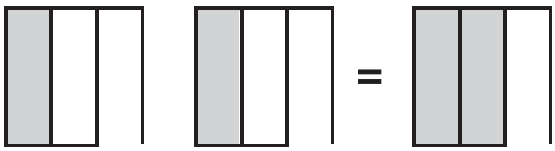
B.



C.



D.



Rationales	
Incorrect – 1	Students choosing this answer likely switched the denominator of 3 and the whole number of 2 in the multiplication, finding a model representing 3 × 1/2 instead of 2 × 1/3. Students choosing this answer may need support in modeling multiplication of whole numbers by unit fractions, and distinguishing how the models differ in order to understand that whole numbers are not interchangeable with denominators or numerators.
Incorrect – 2	Students choosing this answer likely understood that the "2 ×" in the equation meant that a fraction would be shown twice and then totaled. Students chose a model showing 2 × 2/3, however, instead of 2 × 1/3. Students choosing this answer may need support in attending to both sides of an equation to check all parts of a model for accurate representation of the equation.
Incorrect – 3	Students choosing this answer likely switched the denominator of 3 and the whole number of 2 in the multiplication, finding a model representing 3 × 1/2 instead of 2 × 1/3 on the left side of the equation but then treating the halves as thirds on the right side of the equation. Students choosing this answer may need support in understanding how to preserve the 1 whole in modeling and computing with fractions.
Correct – 4	This problem requires students to identify a concrete model that represents an equation involving multiples of a unit fraction. To determine the correct answer, students should have recognized that the fraction 1/3 is modeled twice and then combined in a single whole to result in a model that represents the fraction 2/3. This is a correct interpretation of 2 × 1/3 = 2/3.

Item Information

Item Code: TN712891 Grade Level: 4

Standard Code: 4.NF.B.4.c Position No: 18

Standard Text: Solve contextual problems involving multiplication of a whole number by a fraction (e.g., by using visual fraction models and equations to represent the problem).

Calculator: Y

Correct Answer: C

Xavier has 5 bags of fruit. Each bag of fruit weighs $\frac{8}{3}$ pounds.

Which expression can be used to find how many pounds of fruit Xavier has all together?

A. $5 + \frac{8}{3}$

B. $5 \times 5 \times 5 \times \frac{8}{3} \times \frac{8}{3}$

C. $\frac{8}{3} + \frac{8}{3} + \frac{8}{3} + \frac{8}{3} + \frac{8}{3}$

D. $\frac{8}{3} \times \frac{8}{3} \times \frac{8}{3} \times \frac{8}{3} \times \frac{8}{3}$

Rationales	
Incorrect – 1	Students choosing this answer likely interpreted the "all together" part of the problem to mean that addition should be used to solve the problem and added the given values of 5 and 8/3. Students choosing this answer may need support in distinguishing whether multiplication or addition is needed to solve a problem. In this case, understanding that the fraction 8/3 represents a weight in pounds and the whole number 5 represents a number of bags, the student should reason that adding pounds and bags does not answer the question asked.
Incorrect – 2	Students choosing this answer likely reasoned that multiplication could be used to solve the problem but then used the values given in a multiplication expression that used 5 values, possibly attempting to mix concepts of multiplication and concepts of repeated addition. Students choosing this answer may need support in using either multiplication or repeated addition and not a mix of both in solving a problem.
Correct – 3	This problem requires students to interpret a contextual problem that is solved by multiplying a whole number by a fraction and then understand that repeated addition can be used to represent multiplication. To determine the correct answer, students should have recognized that the situation required multiplying 5 by 8/3. Because that multiplication expression was not among the options, the student then should have reasoned that adding 5 fractions of 8/3 together would result in the same answer because $5 \times 8/3 = 8/3 + 8/3 + 8/3 + 8/3 + 8/3$.
Incorrect – 4	Students choosing this answer likely reasoned that multiplication could be used to solve the problem but then used the given fraction repeatedly in a multiplication expression, possibly attempting to mix concepts of multiplication and concepts of repeated addition. Students choosing this answer may need support in using either multiplication or repeated addition and not a mix of both in solving a problem.

Item Information

Item Code: TN425710 Grade Level: 4

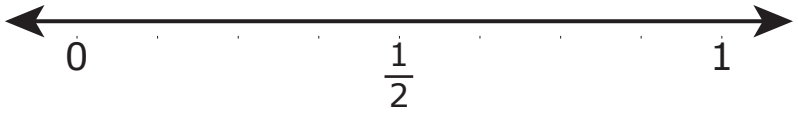
Standard Code: 4.NF.A.2 Position No: 19

Standard Text: Compare two fractions with different numerators and different denominators by creating common denominators or common numerators or by comparing to a benchmark fraction such as 1/2. 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: A

Use the number line to compare the fractions $\frac{2}{8}$ and $\frac{3}{4}$.



Which comparison is true, and why?

A. $\frac{2}{8} < \frac{3}{4}$

This is true because $\frac{2}{8}$ is less than $\frac{1}{2}$ and $\frac{3}{4}$ is greater than $\frac{1}{2}$.

B. $\frac{2}{8} > \frac{3}{4}$

This is true because $\frac{2}{8}$ is greater than $\frac{1}{2}$ and $\frac{3}{4}$ is less than $\frac{1}{2}$.

C. $\frac{2}{8} = \frac{3}{4}$

This is true because both $\frac{2}{8}$ and $\frac{3}{4}$ are greater than $\frac{1}{2}$.

D. $\frac{2}{8} = \frac{3}{4}$

This is true because both $\frac{2}{8}$ and $\frac{3}{4}$ are less than $\frac{1}{2}$.

Rationales	
Correct – 1	This problem requires students to compare two fractions using an inequality and identify correct reasoning that justifies the comparison. To determine the correct answer, students should have compared the fractions 2/8 and 3/4 to a benchmark fraction of 1/2 or to the whole number 1. Reasoning that 2/8 is less than the 4/8 required to make 1/2, students understood that 2/8 is less than 1/2. Reasoning that 3/4 is greater than the 2/4 required to make 1/2, students understood that 3/4 is greater than 1/2. By comparison, then, 2/8 is less than 3/4.
Incorrect – 2	Students choosing this answer likely based their reasoning on the denominators of the fractions 2/8 and 3/4. Because the denominator 8 is greater than the denominator 4, students reasoned that 2/8 must be greater than 3/4. Then they chose the option that showed this inequality and disregarded the explanation that followed. Students choosing this answer may need support in modeling fractions (including unit fractions) that have different denominators and making comparisons both verbally and with equality and inequality symbols.
Incorrect – 3	Students choosing this answer likely based their reasoning on the numerators of the fractions 2/8 and 3/4. Because the numerators 2 and 3 are both greater than 1, students reasoned that both fractions must be greater than 1/2. Then they chose the option that stated this, even though they may not have been certain that the fractions are equal. Students choosing this answer may need support in modeling fractions (including unit fractions) that have different denominators and making comparisons both verbally and with equality and inequality symbols.
Incorrect – 4	Students choosing this answer likely based their reasoning on the understanding that larger denominators indicate smaller portion sizes in a divided whole. Students likely disregarded the numerators in making their comparisons and chose this option based on the explanation stated, even though they may not have been certain that the fractions are equal. Students choosing this answer may need support in modeling unequal fractions with the same denominator and comparing them based on the meaning of the numerator in order to attend to what the entire fraction represents, rather than to its individual parts.

Item Information

Item Code: TN522542 Grade Level: 4

Standard Code: 4.NBT.B.5 Position No: 20

Standard Text: Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Calculator: Y

Correct Answer: A,D,E

An area model is shown.

×	40	7
60	2400	420
5	?	35

One number is missing.

Choose the **three** true statements about the area model.

A. The product of the area model is 3055.

B. The missing number is 20.

C. The model shows 407×605.

D. The missing number is 200.

E. The model shows 47×65.

Rationales	
Correct – 1	This problem requires students to relate a visual model to a multiplication expression and its product. To determine the correct answers, students recognized the multiplication symbol and recognized the partial products in the rectangular sections of the models, based on using the numbers on the top and left of the model as factors. With this reasoning, students then calculated 47 × 65 = 3,055.
Incorrect – 2	Students choosing this answer likely understood that the model represents the product 47 × 65 and determined that the missing partial product is the product in the step when the 4 in 47 is multiplied by the 5 in 65. This ignores, however, the meaning of each digit so used 4 instead of 40 in the calculation, finding 4 × 5 = 20. Students choosing this answer may need support in understanding the meaning of each computation step in a multiplication algorithm, writing full values for the multiplication steps rather than omitting placeholder digits of 0.
Incorrect – 3	Students choosing this answer likely treated the decomposed factors of 47 and 65 as the numbers 407 and 605. Students choosing this answer may need support in understanding the meaning of each computation step in a multiplication algorithm. In this particular item, for example, students would benefit from writing the individual steps out and then relating them to the model. In this problem, the product 47 × 65 is found by calculating four different products and then adding them all together: 7 × 5 = 35, 7 × 60 = 420, 40 × 5 = 200, 40 × 60 = 2400, 2400 + 420 + 200 + 35 = 3055).
Correct – 4	This problem requires students to relate a visual model to a multiplication expression and its product. To determine the correct answers, students recognized the multiplication symbol and recognized the partial products in the rectangular sections of the models, based on using the numbers on the top and left of the model as factors. With this reasoning, students then calculated 40 × 5 = 200.
Correct – 5	This problem requires students to relate a visual model to a multiplication expression and its product. To determine the correct answers, students recognized the multiplication symbol and recognized the partial products in the rectangular sections of the models, based on using the numbers on the top and left of the model as factors. With this reasoning, students then determined that the model represents 47 × 65.

Item Information

Item Code: TN782455 Grade Level: 4

Standard Code: 4.OA.A.2 Position No: 21

Standard Text: Multiply or divide to solve contextual problems involving multiplicative comparison, and distinguish multiplicative comparison from additive comparison.

Calculator: Y

Correct Answer: D

Here are the numbers of green, blue, and red pieces in a game.

- 6 green pieces
- 18 blue pieces
- 24 red pieces

Which sentence about the numbers of pieces in the game is **true**?

A. There are 3 times as many green pieces as blue pieces.

B. There are 12 times as many blue pieces as green pieces.

C. There are 6 times as many red pieces as blue pieces.

D. There are 4 times as many red pieces as green pieces.

Rationales	
Incorrect – 1	Students choosing this answer likely confused the values for green and blue pieces stated in the problem. The number of blue pieces is 3 times as many as the number of green pieces. Students choosing this answer may need support in returning to stated facts in a contextual problem to check answers against them.
Incorrect – 2	Students choosing this answer likely compared 18 and 6 based on their difference. They reasoned that 18 is 12 more than 6, but then chose the statement that said "12 times as many" rather than "12 more than." Students choosing this answer may need support in distinguishing between concepts of "times as many" and "more than."
Incorrect – 3	Students choosing this answer likely compared 24 and 18 based on their difference. They reasoned that 24 is 6 more than 18, but then chose the statement that said "6 times as many" rather than "6 more than." Students choosing this answer may need support in distinguishing between relationships that can be describe with multiplicative language (e.g. "times as many") and those that can be described with additive/subtractive language (e.g. "more than").
Correct – 4	This problem requires students to use multiplicative reasoning to compare numbers. To determine the correct answer, students should have read each answer choice and determined whether the multiplicative relationship stated was accurate based on the context of the problem. Since the problem states that there are 24 red pieces and 6 green pieces, and since 24 is 4 times as many as 6, students chose this answer.

Item Information

Item Code: TN222564 Grade Level: 4

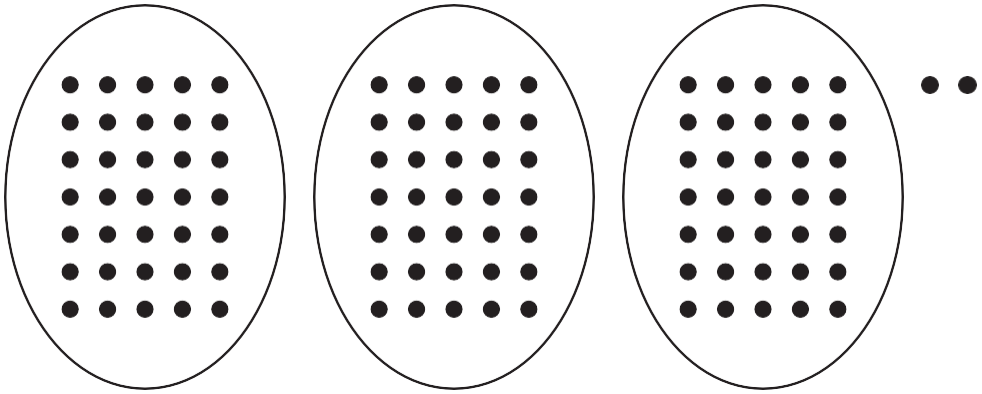
Standard Code: 4.NBT.B.6 Position No: 22

Standard Text: Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Calculator: Y

Correct Answer: D

Which expression is represented by the model?



A. 35 ÷ 3

B. 35 ÷ 2

C. 105 ÷ 3

D. 107 ÷ 3

Rationales	
Incorrect – 1	Students choosing this answer likely recognized that each of the 3 groups of dots had 35 dots. They disregarded the additional 2 dots outside the groups and chose the answer that used both 35 and 3. Students choosing this answer may need support in attending to the entirety of a visual model and not only on part of the model.
Incorrect – 2	Students choosing this answer likely recognized that each of the 3 groups of dots had 35 dots. They also recognized the 2 dots outside the groups and chose the answer that used both 35 and 2, ignoring the significance of the 3 groupings. Students choosing this answer may need support in attending to the entirety of a visual model and not only on part of the model. In addition, students need support in understanding what groupings in a model indicates.
Incorrect – 3	Students choosing this answer likely recognized that each of the 3 groups of dots had 35 dots and calculated that there are 35×3 or 105 dots in the groups. They disregarded the 2 dots outside the groups and chose the answer that represented the division shown by the groupings. Students choosing this answer may need support in attending to the entirety of a visual model and not only on part of the model. In addition, students need support in understanding how remainders are treated when modeling division visually.
Correct – 4	This problem requires students to relate a visual model to a division expression. To determine the correct answer, students should have noted 3 equal groups of dots, indicating a divisor of 3, and then determined the total number of dots to determine what number was being divided. Since each group has 7 rows of 5 dots, the total number of dots is $35 + 35 + 35 + 2$ or 107. Students then should have determined that the division problem represented is $107 \div 3$.

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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