



Checkpoint Results Interpretation Guide

Grade 6 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 6 Math Checkpoint should be given to incoming seventh grade students to help plan for students learning grade 7 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

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“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 – 53%	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	54 – 69%	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	70 – 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 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 6 Math Checkpoint Item Annotations

Item Information

Item Code: TN158129

Grade Level: 6

Standard Code: 6.EE.A.2.a

Position No: 1

Standard Text: Write expressions that record operations with numbers and with variables.

Calculator: N

Correct Answer: B

Which expression is equivalent to the sum of 2 times y and 15?

A. $2y \cdot 15$

B. $2y + 15$

C. $2 + 15y$

D. $2 + y + 15$

Rationales	
Incorrect – 1	Students correctly combined 2 and y through multiplication as indicated but did not associate sum with addition and incorrectly used multiplication to combine $2y$ and 15. These students may need help connecting operations with the vocabulary which describes their mathematical relationships and solutions (e.g., addition and sum).
Correct – 2	This item requires students to correctly recognize how words describe mathematical relationships. Students should have recognized that the phrase “2 times y ” creates a multiplicative relationship (product of $2y$) and subsequently apply the additive relationship with 15.
Incorrect – 3	Students correctly used multiplication and addition as called out in the item but applied the operations to the incorrect terms. These students may need help connecting operations with the vocabulary which describes their mathematical relationships and solutions (e.g., addition and sum).
Incorrect – 4	Students incorrectly applied “times” to indicate addition of 2 and y and subsequently added all three terms. Students may need support with combining numbers and variables through multiplication to create terms. These students may need help connecting operations with the vocabulary which describes their mathematical relationships and solutions (e.g., addition and sum).

Item Information

Item Code: TN182551

Grade Level: 6

Standard Code: 6.EE.B.6

Position No: 2

Standard Text: Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

Calculator: N

Correct Answer: A

Maria buys x books. Each book costs \$5.

Which expression represents the amount of money Maria spends to buy x books?

A. $5x$

B. $5 + x$

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

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

Rationales	
Correct – 1	Students correctly identified that the purchasing of books is a multiplicative relationship and were able to identify the expression that represents that relationship with an unknown quantity of books.
Incorrect – 2	Students may have recognized that as the number of books increases, the cost will increase, but did not identify that the relationship of a total cost requires multiplying the same price by the number of items purchased. Students may need support in selecting appropriate operations in various real-world contexts.
Incorrect – 3	Students may have misread the question as stating that the total cost for x books was 5 dollars and asked for the price per book. Students then divided the 5 dollars by x , which would be the correct answer for the misread question. Students may need support in selecting appropriate operations in various real-world contexts. Students may need support in articulating the real-world units used within word problems to better understand how the units of ratios can help determine the reasonableness of an answer.
Incorrect – 4	Students may have misread the question as stating that the total cost for 5 books was x dollars and asked for the price per book. Students then divided the x dollars by 5, which would be the correct answer for the misread question. Students may need support in selecting appropriate operations in various real-world contexts. Students may need support in articulating the real-world units used within word problems to better understand how the units of ratios can help determine the reasonableness of an answer.

Item Information

Item Code: TN082639

Grade Level: 6

Standard Code: 6.RP.A.2

Position No: 3

Standard Text: Understand the concept of a unit rate a/b associated with a ratio $a:b$ with b not equal to 0. Use rate language in the context of a ratio relationship.

Calculator: N

Correct Answer: B

A truck travels 90 miles on 6 gallons of gas.

What is the rate the truck travels in miles per gallon?

- A.** 6
- B.** 15
- C.** 90
- D.** 540

Rationales	
Incorrect – 1	Students may have incorrectly associated the last value provided in the item with the last measurement indicated in the question. Students may need support in making sense of problems to correctly ascertain what they are asked to find.
Correct – 2	Students correctly identified the mathematical relationship described in the problem and determined the unit rate by creating a ratio using the values provided and subsequently using the correct operation of division.
Incorrect – 3	Students may have correctly created a ratio using the value 90 to represent miles but did not apply the next step in dividing by 6 to find the unit rate. Students may need support in understanding the operations required to calculate a unit rate after using values to create a ratio.
Incorrect – 4	Students may have used the incorrect operation of multiplication to determine the unit rate based on values provided. Students may need support in understanding the correct way to set up a ratio using units and then associate that ratio with division to calculate unit rate.

Item Information

Item Code: TN858498

Grade Level: 6

Standard Code: 6.EE.B.7

Position No: 4

Standard Text: Solve real-world and mathematical problems by writing and solving one-step equations of the form $x + p = q$ and $px = q$ for cases in which p , q , and x are all nonnegative rational numbers.

Calculator: N

Correct Answer: A

Casey earns money, m , for doing chores. He puts that money with \$5.50 he has in his pocket. Casey now has a total of \$35.50.

Which equation represents his total amount of money?

- A.** $m + 5.50 = 35.50$
- B.** $5.50 + 35.50 = m$
- C.** $35.50 + m = 5.50$
- D.** $5.50m = 35.50$

Rationales	
Correct – 1	Students correctly identified the relationships described in the situation, and then describe the relationship mathematically, using the values provided to create an equation that represents the given situation.
Incorrect – 2	Students recognized that “total” represents an additive relationship, but incorrectly associated the unknown value as the total. This can come from an over-reliance on selecting operations based on specific words (e.g. “total”), instead of seeking to understand how the operations represent real-world relationships. Students choosing this answer may need practice articulating the context of a problem prior to selecting an operation to represent the real-world relationships.
Incorrect – 3	Students incorrectly created an equation in which the total value resulting from the addition of positive values is less than the value of one of the addends. Students choosing this answer may need additional support interpreting and rearticulating the story described in real-world problems.
Incorrect – 4	Students correctly identified that 35.50 is the result of an increase but used the incorrect operation of multiplication in order to do so. Students choosing this answer may need practice articulating the context of a problem prior to selecting an operation to represent the real-world relationships.

Item Information

Item Code: TN246281

Grade Level: 6

Standard Code: 6.EE.C.9.a

Position No: 5

Standard Text: Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.

Calculator: N

Correct Answer: B

Drew has a job making pizzas. He can make pizza in 7.5 minutes.

Which equation can be used to find m , the number of minutes it takes Drew to make p pizzas?

A. $p = \frac{7.5}{m}$

B. $m = 7.5p$

C. $m = \frac{p}{7.5}$

D. $p = 7.5m$

Rationales	
Incorrect – 1	Students incorrectly created an equation in which they attempted to find the number of pizzas. Additionally, they created a ratio of 7.5 to m rather than using 7.5 as a coefficient to determine the number of minutes. They may need additional support interpreting a proportional relationships and how they are represented in real-world context.
Correct – 2	Students correctly identified the proportional relationships described in the problem, and created an equation in which the coefficient 7.5 was used to multiply by the independent variable p in order to determine the dependent variable m .
Incorrect – 3	Students correctly distinguished between the dependent and independent variable but applied the incorrect operation to determine the value of m . Students choosing this answer may need additional support interpreting and rearticulating the story described in real-world problems.
Incorrect – 4	Students incorrectly identified the dependent and independent variables while correctly using multiplication as the necessary operation. Students choosing this answer may need practice articulating the context of a problem prior to selecting an operation to represent the real-world proportional relationships.

Item Information

Item Code: TN646530

Grade Level: 6

Standard Code: 6.NS.A.1

Position No: 6

Standard Text: Interpret and compute quotients of fractions, and solve contextual problems involving division of fractions by fractions (e.g., using visual fraction models and equations to represent the problem is suggested).

Calculator: N

Correct Answer: A

An equation is given.

$$\frac{1}{4} \div x = \frac{2}{12}$$

What value of x makes the equation true?

- A.** $\frac{3}{2}$
- B.** $\frac{2}{3}$
- C.** $\frac{1}{8}$
- D.** $\frac{1}{12}$

Rationales	
Correct – 1	Students correctly identified the mathematical relationship described in the problem and determined the value that would result in the given quotient by correctly dividing the two given fractions.
Incorrect – 2	Students may have incorrectly divided $2/12$ by $1/4$ to result in $2/3$. Students may need support in applying the steps used to solve equations in one variable to equations involving rational numbers.
Incorrect – 3	Students may have incorrectly subtracted $1/4$ from $2/12$ by subtracting numerators and denominators. Students may need support in applying the steps used in solving equations to include rational numbers. Students may need support in applying steps to subtract fractions with different denominators.
Incorrect – 4	Students may have incorrectly subtracted $2/12$ from $1/4$ using common denominators. Students may need support in applying the steps used in solving equations to include rational numbers.

Item Information

Item Code: TN146191

Grade Level: 6

Standard Code: 6.EE.A.2.c

Position No: 7

Standard Text: Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

Calculator: N

Correct Answer: A,C,D

Which expressions are equal to 16 when $x = 4$?

Select the **three** correct answers.

A. $2x \div 0.5$

B. $4x \cdot x - 3$

C. $\frac{x^3}{4}$

D. $5x - 16 \div x$

E. $\frac{1}{2}x + 8$

Rationales	
Correct – 1	Students correctly used the order of operations to calculate 16 for the given value of x .
Incorrect – 2	Students may have incorrectly subtracted 3 from the coefficient of 4 before multiplying. Students may need support in using the order of operations correctly in problems requiring multiple steps and operations.
Correct – 3	Students correctly used the order of operations to calculate 16 for the given value of x .
Correct – 4	Students correctly used the order of operations to calculate 16 for the given value of x .
Incorrect – 5	Students may have incorrectly substituted 16 rather than 4 for the value of x . The order of operations and calculations were applied correctly but students may need support with making sense of problems and using given information to correctly solve problems.

Item Information

Item Code: TN842676

Grade Level: 6

Standard Code: 6.EE.C.9.a

Position No: 8

Standard Text: Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.

Calculator: N

Correct Answer: B

It takes Alia 7 minutes to run one mile.

Which equation can be used to show the relationship between Alia's number of miles, m , and the total time of her run, t ?

A. $7t = m$

B. $7m = t$

C. $7 + m = t$

D. $m - 7 = t$

Rationales	
Incorrect – 1	Students incorrectly identified the dependent and independent variables to create an equation using the correct operation of multiplication but to find the incorrect unknown value. Students may need support identifying dependent variables in a given context and associating them with values to be determined upon calculation.
Correct – 2	Students correctly identified the mathematical relationship described in the problem and identified the dependent variable as the value being sought and the independent variable as the value being used in the calculation to correctly set up the equation.
Incorrect – 3	Students correctly assigned the variables in this relationship but used an incorrect operation to try to determine the total value. Students may need support with the concept of using a coefficient to determine a total dependent on the value of a variable thus requiring in this case multiplication of 7 and the number of miles Alia runs.
Incorrect – 4	Students correctly assigned the variables in this relationship but used an incorrect operation to try to determine the total value. Students may need support with the concept of using a coefficient to determine a total dependent on the value of a variable thus requiring in this case multiplication of 7 and the number of miles Alia runs.

Item Information

Item Code: TN846689

Grade Level: 6

Standard Code: 6.NS.A.1

Position No: 9

Standard Text: Interpret and compute quotients of fractions, and solve contextual problems involving division of fractions by fractions (e.g., using visual fraction models and equations to represent the problem is suggested).

Calculator: N

Correct Answer: C

Three children divide $\frac{2}{3}$ of a pizza equally. Which fraction represents the part of the whole pizza each child receives?

- A.** $\frac{1}{2}$
- B.** $\frac{1}{3}$
- C.** $\frac{2}{9}$
- D.** $\frac{6}{3}$

Rationales	
Incorrect – 1	Students may have incorrectly divided the original whole pizza by 3 to find $\frac{1}{3}$ and then divided that value by $\frac{2}{3}$ to get $\frac{1}{2}$. Students may need support in assessing the reasonableness of answers to realize that their correct fraction calculations led to an answer that suggests 3 children can each receive $\frac{1}{2}$ of a pizza.
Incorrect – 2	Students incorrectly disregarded the starting value of $\frac{2}{3}$ of a pizza and subsequently divided a whole pizza by 3 to get $\frac{1}{3}$. Students may need support in making sense of problems and assigning relevance to given information in contextual problems.
Correct – 3	Students correctly identified the mathematical relationship described in the problem and divided $\frac{2}{3}$ by 3 to find the amount of pizza each of 3 children would receive is $\frac{2}{9}$ of the original whole pizza.
Incorrect – 4	Students may have incorrectly multiplied $\frac{2}{3}$ by 3. Students may need support in understanding the steps required to compute quotients of fractions.

Item Information

Item Code: TN452634

Grade Level: 6

Standard Code: 6.EE.B.7

Position No: 10

Standard Text: Solve real-world and mathematical problems by writing and solving one-step equations of the form $x + p = q$ and $px = q$ for cases in which p , q , and x are all nonnegative rational numbers.

Calculator: N

Correct Answer: A

Abe earns \$30.00 for raking his neighbor's leaves. He bought lunch and has \$22.75 left. The equation $x + 22.75 = 30.00$ can be used to determine x , the amount of money, in dollars, Abe spent for lunch.

Which value of x represents the amount of money, in dollars, Abe spent on lunch?

- A.** $x = 7.25$
- B.** $x = 7.75$
- C.** $x = 8.25$
- D.** $x = 8.75$

Rationales	
Correct – 1	Students correctly identified the mathematical relationship described in the problem and solved the given equation using the steps and correct calculations required.
Incorrect – 2	Students used the proper steps required to solve the given equation but incorrectly subtracted when calculating the value of lunch as the result of their subtraction. Students may need support in using all the operations with numbers involving decimals and in attending to precision.
Incorrect – 3	Students used the proper steps required to solve the given equation but incorrectly subtracted when calculating the value of lunch as the result of their subtraction, specifically, a failure to reduce 30 to 29 when subtracting the 0.75. Students may need support in using all the operations with numbers involving decimals and in attending to precision.
Incorrect – 4	Students used the proper steps required to solve the given equation but incorrectly subtracted when calculating the value of lunch as the result of their subtraction. Students may need support in using all the operations with numbers involving decimals and in attending to precision.

Item Information

Item Code: TN358297

Grade Level: 6

Standard Code: 6.RP.A.2

Position No: 11

Standard Text: Understand the concept of a unit rate a/b associated with a ratio $a:b$ with b not equal to 0. Use rate language in the context of a ratio relationship.

Calculator: N

Correct Answer: B

Julie paid \$18 for 6 notebooks.

How much did each notebook cost?

- A.** \$0.33
- B.** \$3.00
- C.** \$6.00
- D.** \$12.00

Rationales	
Incorrect – 1	Students incorrectly created a ratio which used 18 notebooks at a total cost of \$6. Students may need support in understanding that when creating ratios to determine unit price that cost per item dictates the way the values should be assigned to the ratio.
Correct – 2	Students correctly identified the mathematical relationship described in the problem and created a ratio to determine a unit rate to determine the cost per notebook.
Incorrect – 3	Students did not create a ratio to determine a unit rate to find the cost per notebook, but simply used one of the given numbers as the answer. Students may need support with the concept of ratios as comparisons of values of different units of measure, in this case dollars and notebooks, and the operation of division required then to calculate the cost of 1 notebook.
Incorrect – 4	Students may have subtracted the given values rather than creating a ratio to determine a unit rate to find the cost per notebook. Students may need support with the concept of ratios as comparisons of values of different units of measure. In this case dollars and notebooks, therefore they cannot be subtracted.

Item Information

Item Code: TN146183

Grade Level: 6

Standard Code: 6.EE.A.2.c

Position No: 12

Standard Text: Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

Calculator: N

Correct Answer: C

What is the value of the expression $2 + x^2 \cdot 5$ when $x = 3$?

- A.** 125
- B.** 55
- C.** 47
- D.** 32

Rationales	
Incorrect – 1	Students may have correctly substituted for the value of the variable but incorrectly applied the order of operations by adding 2 and 3 then applying the exponent of 2 before multiplying the resulting 25 by 5. Students may need support with the conventional order of operations and applying them in situations that require multiple steps.
Incorrect – 2	Students may have correctly substituted for the value of x and applied the exponent of 2 but then incorrectly applied the order of operations by adding 2 before multiplying by 5. Students may need support with the conventional order of operations and applying them in situations that require multiple steps.
Correct – 3	Students correctly substituted for the value of x and applied the order of operations.
Incorrect – 4	Students correctly substituted for the value of x but incorrectly applied the exponent of 2 as multiplying the base by 2 resulting in 6. From there they correctly applied the order of operations, but the earlier exponent error led to an incorrect result. Students may need support with the rules of exponents and their application.

Item Information

Item Code: TN657395

Grade Level: 6

Standard Code: 6.RP.A.3.c

Position No: 13

Standard Text: Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

Calculator: Y

Correct Answer: C

A department store sold 20% of the dresses they had in stock. After the sale they had 60 dresses left.

What was the original number of dresses before the sale?

- A.** 48
- B.** 72
- C.** 75
- D.** 80

Rationales	
Incorrect – 1	Students calculated 20% of 60 as 12 and subtracted 12 from 60 to get 48 dresses. These students may need support understanding that a value given as the result of the reduction of an unknown value should result in a value larger than the given value.
Incorrect – 2	Students may have calculated 20% of 60 as 12 and added that back to 60 to get 72. These students may benefit from increased understanding of how to create an expression or equation that will determine an original, unknown quantity, the calculation of which would result in the given value.
Correct – 3	Students identified the mathematical relationship described in the problem and correctly calculated 60 as 80% remaining of the unknown value, 75.
Incorrect – 4	Students may have added 20 to the given 60 to result in 80. These students may benefit from increased understanding of how to create an expression or equation that will determine an original, unknown quantity, the calculation of which would result in the given value. They may also need support in the use of percent as an equivalent rational number for calculations.

Item Information

Item Code: TN572714

Grade Level: 6

Standard Code: 6.EE.C.9.b

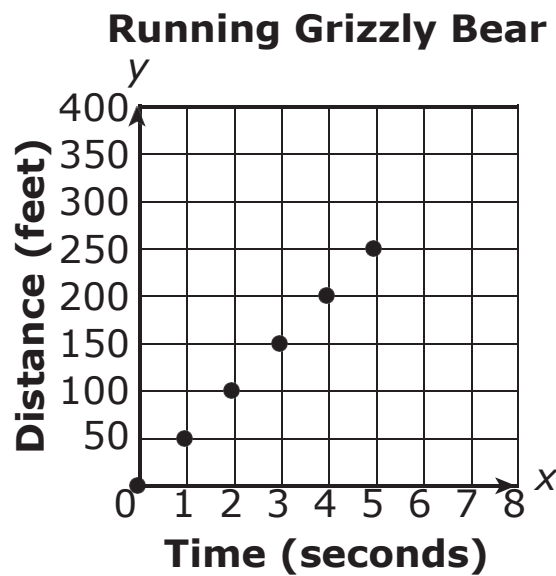
Position No: 14

Standard Text: Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Calculator: Y

Correct Answer: B

The graph shows the relationship between the time, x , and the distance, y , of a running grizzly bear.



Which equation shows the relationship between x and y that is represented by the graph?

- A.** $y = 50 \div x$
- B.** $y = 50x$
- C.** $x + 50 = y$
- D.** $51 - y = x$

Rationales	
Incorrect – 1	Students assigned the variables correctly but incorrectly used division to indicate the operation used to determine the impact of the coefficient 50 on the variable y . Students may need support with concept of using the independent variable to find the dependent variable at each point in the graph of the relationship.
Correct – 2	Students correctly identified the mathematical relationship described in the problem and identified the relationship in the change in the value of y as a result of the value of x changing and applied to the coefficient in the situation.
Incorrect – 3	Students may have incorrectly calculated a slope of 1, disregarding the scale on the y -axis, and used the first y -value to identify the intercept. Students may need support in relating points on the graph to the values of x and y to create an equation that is true for any point on the graph.
Incorrect – 4	Students may have identified a relationship that agrees with the first point away from the origin (1,50), but did not verify it holds for other points in the graph. Students may need support in relating points on the graph to the values of x and y to create an equation that is true for any point on the graph.

Item Information

Item Code: TN720310

Grade Level: 6

Standard Code: 6.RP.A.3.b

Position No: 15

Standard Text: Solve unit rate problems including those involving unit pricing and constant speed.

Calculator: Y

Correct Answer: B

What is the unit price of a granola bar if 8 granola bars cost \$4.16?

- A.** \$0.42
- B.** \$0.52
- C.** \$1.92
- D.** \$5.20

Rationales	
Incorrect – 1	Students may have created a ratio correctly and used it to divide in order to find the unit rate but committed an error during the calculation resulting in an incorrect value. Students may need support in attending to precision.
Correct – 2	Students correctly identified the mathematical relationship described in the problem and created a ratio comparing cost to number of bars and solved correctly by dividing 4.16 by 8 to get 0.52.
Incorrect – 3	Students created a ratio incorrectly comparing bars to total cost by reversing the values in context, finding the number of bars per dollar. The subsequent correct application of division resulted in an incorrect value. Students may need support in creating ratios to determine unit rates as determined by what value is desired to be 1 in the rate.
Incorrect – 4	Students may have created a ratio correctly and used it to divide in order to find the unit rate but committed an error in placement of the decimal during the calculation resulting in an incorrect value. Students may need support in attending to precision.

Item Information

Item Code: TN446559

Grade Level: 6

Standard Code: 6.NS.A.1

Position No: 16

Standard Text: Interpret and compute quotients of fractions, and solve contextual problems involving division of fractions by fractions (e.g., using visual fraction models and equations to represent the problem is suggested).

Calculator: Y

Correct Answer: C

Benny uses $\frac{2}{5}$ gallon of gas to mow his entire lawn one time.

What is the maximum number of times Benny can mow his entire lawn with $3\frac{1}{2}$ gallons of gas?

- A.** 6
- B.** 7
- C.** 8
- D.** 9

Rationales	
Incorrect – 1	Students did not divide the given fractions correctly. Students may need support with the concepts required to compute fractional operations involving mixed numbers.
Incorrect – 2	Students may have disregarded the $\frac{1}{2}$ gallon in addition to the 3 gallons available and divided correctly to find $7\frac{1}{2}$ which would lead to a correct use of the whole number 7 which is an incorrect result. Students may need support determining relevance of given values in contextual problems.
Correct – 3	Students correctly identified the mathematical relationship described in the problem and divided the amount of available gas by the amount required for each use to get $8\frac{3}{4}$ which limits the maximum whole number uses available to 8.
Incorrect – 4	Students may have correctly divided the amount of available gas by the amount required for each use to get $8\frac{3}{4}$ but incorrectly rounded the answer, rather than taking the whole-number portion. Students may need support with the concept of contexts that require whole number values.

Item Information

Item Code: TN058151

Grade Level: 6

Standard Code: 6.RP.A.3.c

Position No: 17

Standard Text: Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

Calculator: Y

Correct Answer: B

What percent of 400 is 75?

- A.** 5.33%
- B.** 18.75%
- C.** 25%
- D.** 53%

Rationales	
Incorrect – 1	Students incorrectly reversed the placement of the given values to find what multiple of 75 is 400. Students may need support in understanding how to correctly create a ratio or expression to find the unknown percent.
Correct – 2	Students correctly identified the mathematical relationship described in the problem and used a ratio or equation to calculate the unknown percent 75 is of 400.
Incorrect – 3	Students may have used estimation strategies to incorrectly determine 75 as approximately 25% of 400. Students may need support in understanding how to correctly create a ratio or expression to find the unknown percent.
Incorrect – 4	Students incorrectly reversed the placement of the given values to find what percent of 75 is 400. Additionally, they may have converted the decimal value found into a percent incorrectly. Students may need support in understanding how to correctly create a ratio or expression to find the unknown percent and how to express rational numbers as percents.

Item Information

Item Code: TN946549

Grade Level: 6

Standard Code: 6.NS.A.1

Position No: 18

Standard Text: Interpret and compute quotients of fractions, and solve contextual problems involving division of fractions by fractions (e.g., using visual fraction models and equations to represent the problem is suggested).

Calculator: Y

Correct Answer: B,C

The area of Natalie's new bedroom rug is $3\frac{3}{4}$ square feet. The width of the rug is

$2\frac{1}{2}$ feet. What is the length of Natalie's rug?

Select **all** correct answers.

A. $\frac{2}{3}$

B. $\frac{3}{2}$

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

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

E. $3\frac{1}{2}$

Rationales	
Incorrect – 1	Students may have incorrectly divided the width by the area, instead of dividing the area by the width. Students may need support in applying given values in situational problems to create expressions or equations to find values.
Correct – 2	Students correctly identified the mathematical relationship described in the problem and created an equation that used steps for solving that resulted in dividing the total area by the width to get a length of $3/2$ or $1\frac{1}{2}$.
Correct – 3	Students correctly identified the mathematical relationship described in the problem and created an equation that used steps for solving that resulted in dividing the total area by the width to get a length of $3/2$ or $1\frac{1}{2}$.
Incorrect – 4	Students did not correctly create an equation that would be used to find an unknown side length given an area. Students may need support in applying given values in situational problems to create expressions or equations to find values.
Incorrect – 5	Students may have correctly calculated the value of $3/2$, but interpreted the mixed number as a product. Students may need support in applying given values in situational problems to create expressions or equations to find values.

Item Information

Item Code: TN120333

Grade Level: 6

Standard Code: 6.RP.A.3.c

Position No: 19

Standard Text: Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

Calculator: Y

Correct Answer: A

Of the 220 tickets available for a school play, 45% have been sold.

What is the number of tickets that have sold?

- A.** 99
- B.** 175
- C.** 489
- D.** 990

Rationales	
Correct – 1	Students correctly identified the mathematical relationship described in the problem and created an equation or a proportion to find an unknown part of a whole given the percent.
Incorrect – 2	Students may have subtracted 45% as a whole number from the total tickets available to get 175. Students may need support understanding the mathematical operations required when finding percent of a whole as well as using percent as rational numbers.
Incorrect – 3	Students may have correctly calculated using an equation or proportion that incorrectly applied the given values in the situation. 220 is 45% of 489. Students may need support understanding the assigning of values as either the part or the whole in contextual problems.
Incorrect – 4	Students may have correctly created an equation or proportion to find the unknown part but committed an error in the conversion of the percent to a rational number. Students may need support in using percent and equivalent rational numbers and converting between the two for required calculations.

Item Information

Item Code: TN846208

Grade Level: 6

Standard Code: 6.EE.A.4

Position No: 20

Standard Text: Identify when expressions are equivalent (i.e., when the expressions name the same number regardless of which value is substituted into them).

Calculator: Y

Correct Answer: C,E

Which expression is equivalent to $3y + 6$? Select **two** correct answers.

- A.** $y^2 + 2y + 6$
- B.** $3(y + 6)$
- C.** $5y + 1 - 2y + 5$
- D.** $(y + 3) + 6$
- E.** $3(y + 2)$

Rationales	
Incorrect – 1	Students may have used 1 as the value for y which would incorrectly lead them to believe the expressions were equivalent for all values of y . Students may need support in using greater values for substitution and subsequent multiple operations in given expressions.
Incorrect – 2	Students may have incorrectly used the distributive property as applying only to the first value in the enclosed portion of the expression. Students may need support in understanding of the distributive property and its application.
Correct – 3	Students correctly applied the order of operations using a substituted value greater than 1 which would make the expression equivalent for all values. Students correctly combined like terms to verify that this expression is equivalent to the given one.
Incorrect – 4	Students may have committed an error in which they equated the associative property with the distributive property which led them to incorrectly decide the expressions were equivalent for all values of y . Students may need support in understanding of the distributive property and its application on given values.
Correct – 5	Students correctly applied the order of operations using a substituted value greater than 1 which would make the expression equivalent for all values. Students correctly applied the distributive property to verify this expression is equivalent to the given one.

Item Information

Item Code: TN420347

Grade Level: 6

Standard Code: 6.RP.A.3.a

Position No: 21

Standard Text: Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

Calculator: Y

Correct Answer: B

Marcus is making a ratio table to use when mixing pints of paint colors. He will use this table to mix an identical color.

Color A (pints)	Color B (pints)
5	8
10	?
15	24
20	32

What is the missing value in the ratio table?

- A.** 13
- B.** 16
- C.** 18
- D.** 19

Rationales	
Incorrect – 1	Students may have incorrectly applied the increase in each value by 5 for the values of Color A to the values of Color B to add 5 to 8 for a result of 13. Students may need support understanding ratio relationships and the application of proportionality to discover equivalent ratios.
Correct – 2	Students correctly identified the mathematical relationship described in the problem and used the values to apply the concept of proportionality to determine the value which would create an equivalent ratio.
Incorrect – 3	Students may have incorrectly applied the increase in each value by 8 for the values of Color B to the values of Color A to add 8 to 10 for a result of 18. Students may need support understanding ratio relationships and the application of proportionality to discover equivalent ratios.
Incorrect – 4	Students may have incorrectly applied the increase in each value by 5 for the values of Color A to the values of Color B to subtract 5 from 24 for a result of 19. Students may need support understanding ratio relationships and the application of proportionality to discover equivalent ratios.

Item Information

Item Code: TN258359

Grade Level: 6

Standard Code: 6.EE.B.5

Position No: 22

Standard Text: Understand solving an equation or inequality is carried out by determining if any of the values from a given set make the equation or inequality true. Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

Calculator: Y

Correct Answer: C,D,E

Select **all** of the values of x that make the inequality $4x \geq 8$ true.

- A.** 0
- B.** 1
- C.** 2
- D.** 3
- E.** 4

Rationales	
Incorrect – 1	Students may have incorrectly reversed the inequality sign when dividing by 4, leading to an incorrect application of the given value when solving the inequality. Students may need support using inequality signs and their meanings for the values they compare.
Incorrect – 2	Students may have incorrectly reversed the inequality sign when dividing by 4, leading to an incorrect application of the given value when solving the inequality. Students may need support using inequality signs and their meanings for the values they compare.
Correct – 3	Students correctly solved the inequality to determine the value made the inequality true.
Correct – 4	Students correctly solved the inequality to determine the value made the inequality true.
Correct – 5	Students correctly solved the inequality to determine the value made the inequality true.

Item Information

Item Code: TN646490

Grade Level: 6

Standard Code: 6.EE.C.9.a

Position No: 23

Standard Text: Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.

Calculator: Y

Correct Answer: B

One type of soft drink contains 9.3 teaspoons of sugar per can.

Which equation can be used to show the relationship between the number of cans of soft drink, c , and the total number of teaspoons of sugar, s ?

A. $9.3s = c$

B. $9.3c = s$

C. $s + 9.3 = c$

D. $\frac{c}{9.3} = s$

Rationales	
Incorrect – 1	Students incorrectly assigned the variables according to dependent and independent, which may have come from placing each variable in the order listed in the first sentence. Students choosing this answer may need additional support interpreting and rearticulating the story described in real-world proportional relationship problems.
Correct – 2	Students correctly identified the proportional relationship and were able to represent it in an equation which assigned the variables appropriately in order to find the total sugar, s .
Incorrect – 3	Students incorrectly determined to find the total value of c and additionally used addition as the operation required for calculation. This can come from an over-reliance on selecting operations based on specific words (e.g. “total”), instead of seeking to understand how the operations represent real-world relationships. Students choosing this answer may need practice articulating the context of a problem prior to selecting an operation to represent the real-world relationships.
Incorrect – 4	Students recognized that s was the variable they were solving for, but misunderstood the proportional relationship described, swapping the dependent and independent variables. They may need additional support interpreting a proportional relationships and how they are represented in real-world context.

Item Information

Item Code: TN358203

Grade Level: 6

Standard Code: 6.RP.A.1

Position No: 24

Standard Text: Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Calculator: Y

Correct Answer: C

There are 15 boys and 10 girls in Ms. Rogers' class. What is the ratio of boys to girls?

- A.** 2:3
- B.** 2:5
- C.** 3:2
- D.** 3:5

Rationales	
Incorrect – 1	Students found the ratio of girls to boys, rather than that of boys to girls. While there are many ways of representing proportional relationships, these students may need support understanding that the description of the relationship helps clarify the placement of numbers or variables in mathematical expressions (e.g. conceptually, what is the difference between “boys to girls” and “girls to boys” in this case).
Incorrect – 2	Students found the ratio of girls to the total number of boys and girls, rather than that of boys to girls. These students may not have recognized that ratio relationships can be numerically simplified and still represent the same relationship, and that these relationships can be represented in many ways. They may need support recognizing equivalent mathematical and verbal representations of the same real-world relationships.
Correct – 3	Students correctly identified the ratio relationship and simplified the relationship to create an equivalent ratio of boys to girls using the given values.
Incorrect – 4	Students found the ratio of boys to the total number of boys and girls, rather than that of boys to girls. These students may benefit from additional support in understanding the difference between part-to-part and part-to-whole ratio relationships in real-world problems.

Item Information

Item Code: TN546605

Grade Level: 6

Standard Code: 6.NS.A.1

Position No: 25

Standard Text: Interpret and compute quotients of fractions, and solve contextual problems involving division of fractions by fractions (e.g., using visual fraction models and equations to represent the problem is suggested).

Calculator: Y

Correct Answer: D

Suzy is taking a class at the community college. The class will meet for a total of $18\frac{3}{4}$ hours. The class will meet once a week for $1\frac{1}{4}$ hours. For how many weeks

will the class meet?

- A.** 23
- B.** 20
- C.** 18
- D.** 15

Rationales	
Incorrect – 1	Students possibly multiplied the two values in the problem. Students choosing this answer may need practice articulating the context of a problem prior to selecting an operation to represent the real-world relationships.
Incorrect – 2	Students may have added $\frac{5}{4}$ rather than dividing. This can come from an over-reliance on selecting operations based on specific words (e.g. “total”), instead of seeking to understand how the operations represent real-world relationships. Students choosing this answer may need practice articulating the context of a problem prior to selecting an operation to represent the real-world relationships.
Incorrect – 3	Students possibly used estimation strategies to create an expression approximating 18 (e.g. 18 divided by 1). These students may need additional support in understanding how different representations of fractions can help make the use of operations easier.
Correct – 4	Students correctly identified the mathematical relationship described in the problem and created an expression using the context provided and computed the resulting quotient correctly by dividing $18\frac{3}{4}$ by $1\frac{1}{4}$.

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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