

New Mexico NM-MSSA Grade 5 Math Practice

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NEW MEXICO MEASURES
OF STUDENT SUCCESS AND
ACHIEVEMENT

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NM-MSSA

Mathematics

Grade 5 • Practice Test



PLACE STUDENT
LABEL HERE

Mathematics Session 1

DIRECTIONS

Today you will take a test in mathematics. For this test, you will answer selected-response and constructed-response questions. Some of the questions may look different from test questions you have seen before, and some may ask about material that is new to you, but it is important to do your best. If you are not sure of the answer to a question, you should still try to answer it. You may NOT use a calculator to answer the questions in this session.

1. Cathy bought $2\frac{5}{6}$ pounds of strawberries at a grocery store. She kept $1\frac{1}{4}$ pounds and gave the rest to Ricardo.

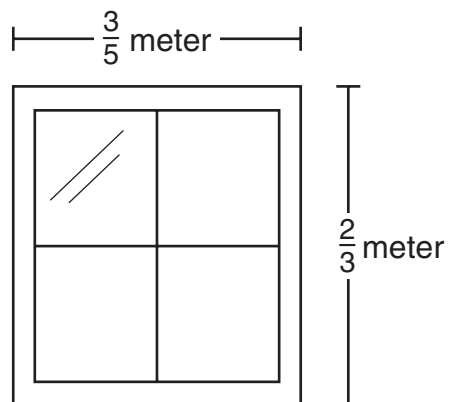
How many pounds of strawberries did Cathy give to Ricardo?

- A $1\frac{4}{2}$
- B $1\frac{2}{5}$
- C $1\frac{1}{6}$
- D $1\frac{7}{12}$

2. Which number sentences are true? Select the **two** correct answers.

- A $7.168 < 7.68$
- B $7.8 > 7.86$
- C $7.86 < 7.089$
- D $7.06 > 7.8$
- E $7.45 > 7.449$

3. A window in the shape of a rectangle and its dimensions are shown.



What is the area of the window?

- A** $\frac{1}{3}$ square meter
- B** $\frac{2}{5}$ square meter
- C** $\frac{5}{8}$ square meter
- D** $\frac{9}{10}$ square meter

Use the information below to answer questions 4 and 5.

Ms. Barry showed her students this expression.

$$36 \div (6 + 3) + (6 - 3)$$

She asked the students to write an equivalent expression.

4. Here are four students' expressions.

- Cala: $36 \div (9 + 3)$
- Martin: $(36 \div 9) + (6 - 3)$
- Tisa: $36 \div 9 + 3$
- Zhong: $(36 \div 6) + (36 \div 3) + 3$

Which students wrote a correct equivalent expression?

- A** Cala and Martin
- B** Martin and Tisa
- C** Tisa and Cala
- D** Zhong and Martin

5. Eli said the value of the expression is 3.

Is Eli correct?

- A** Yes, because $36 \div 6 = 6$ and $6 - 3 = 3$.
- B** Yes, because $9 + 3 = 12$ and $36 \div 12 = 3$.
- C** No, because $36 \div 9 = 4$ and $4 + 3 = 7$.
- D** No, because $6 + 12 = 18$ and $18 + 3 = 21$.

6. Ms. Henry asked her students to solve this problem.

Micah has a rope that is 1.35 meters long. His rope is 1.5 times the length of Angela's rope. What is the length, in meters, of Angela's rope?

- Abby thinks the answer is 0.15 meters because $1.5 - 1.35 = 0.15$.
- Brian thinks the answer is 0.9 meters because $1.35 \div 1.5 = 0.9$.
- Lance thinks the answer is 2.25 meters because $1.35 \times 1.5 = 2.25$.
- Darius thinks the answer is 2.85 meters because $1.5 + 1.35 = 2.85$.

Which student used a correct approach to solve the problem?

- A Abby
- B Brian
- C Lance
- D Darius

SESSION

1

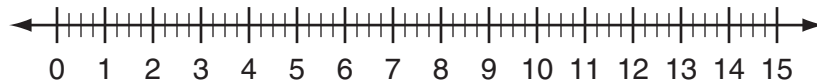
7. Nicole and Vivien wrote expressions in different forms to represent this calculation.

Subtract 4 from 12 and multiply by 6.

Write **two** expressions in different forms that represent this calculation. Show or explain why both expressions represent the calculation.



8. Jason cuts a 15-inch board into 4 equal pieces. He creates this number line to help him find the length of the pieces.



What is the length of each of the 4 pieces Jason cut?

- A $3\frac{1}{4}$ in.
- B $3\frac{3}{4}$ in.
- C $4\frac{1}{4}$ in.
- D $4\frac{3}{4}$ in.
9. A library has 100,000 books.
- What is another way to write 100,000?
- A 100×10^2 because this is equal to 100×100
- B 10×10^4 because this is equal to $10 \times 10,000$
- C 100×10^4 because this is equal to $100 \times 10,000$
- D 10×10^5 because this is equal to $10 \times 100,000$

- 10.** The distance from Lillian's house to her cousin's house is 30 miles. The distance from Lillian's house to her grandma's house is $\frac{1}{5}$ the distance from Lillian's house to her cousin's house.

Based on this information, what is the distance from Lillian's house to her grandma's house?

- A** 150 miles
- B** 30 miles
- C** 25 miles
- D** 6 miles

- 11.** Which plan tells how to solve $754.2 \div 10^3$?

- A** divide 754.2 by 10
- B** multiply 754.2 by 10
- C** divide 754.2 by 1,000
- D** multiply 754.2 by 1,000

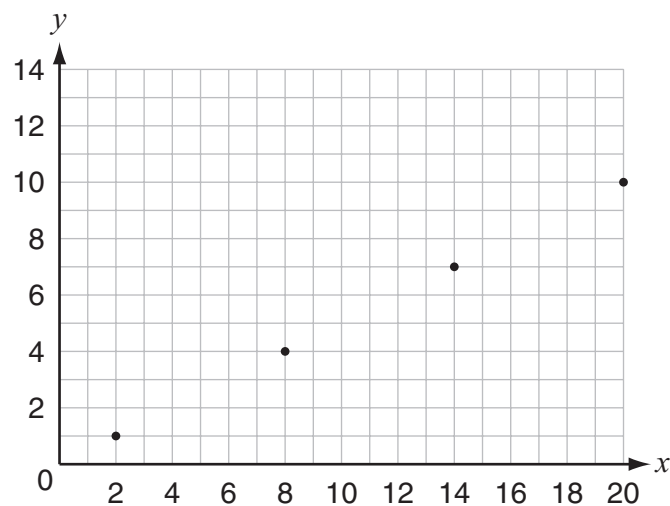


- 12.** A number is multiplied by 10^4 .

Which statement describes how the decimal point in the number changes when finding the product?

- A** The decimal point moves 4 places to the left.
- B** The decimal point moves 10 places to the left.
- C** The decimal point moves 4 places to the right.
- D** The decimal point moves 10 places to the right.

- 13.** Pat graphed the corresponding terms of two patterns. The x-coordinate is from the first pattern and the y-coordinate is from the second pattern.



Based on the graph, what is the relationship between the corresponding terms?

- A** The numbers in the second pattern are half the numbers in the first pattern.
- B** The numbers in the second pattern are two times the numbers in the first pattern.
- C** The numbers in the second pattern are one less than the numbers in the first pattern.
- D** The numbers in the second pattern are three more than the numbers in the first pattern.

This question has three parts. Be sure to answer all parts of the question.

- 14.** Ken painted some furniture. He used $\frac{3}{4}$ gallon of gray paint and $\frac{3}{8}$ gallon of white paint.
- a. How many total gallons of paint did Ken use? Use words or numbers to explain how you know.

Maureen also painted some furniture. She used $\frac{11}{16}$ gallon of blue paint and $\frac{1}{4}$ gallon of white paint.

- b. Who used more total gallons of paint, Ken or Maureen? Use words or numbers to explain how you know.

Ken and Maureen each painted one more piece of furniture. Ken used $\frac{3}{16}$ gallon of paint, and Maureen used $\frac{3}{8}$ gallon of paint.

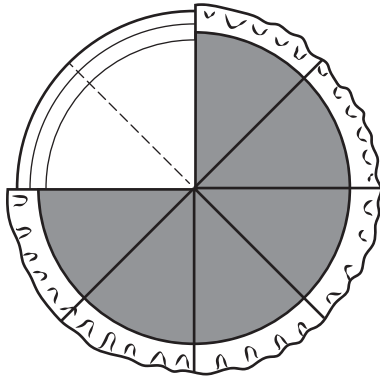
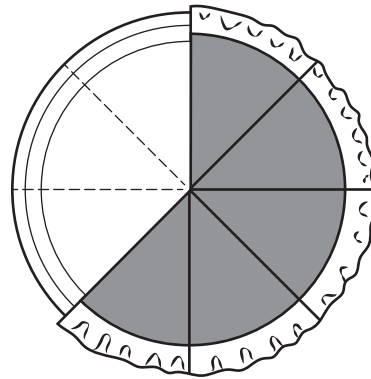
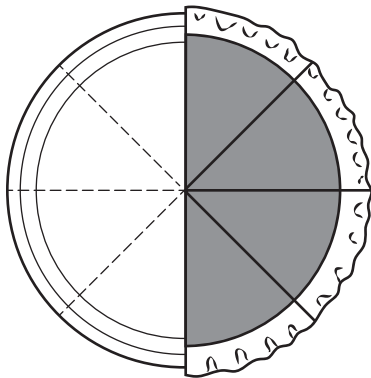
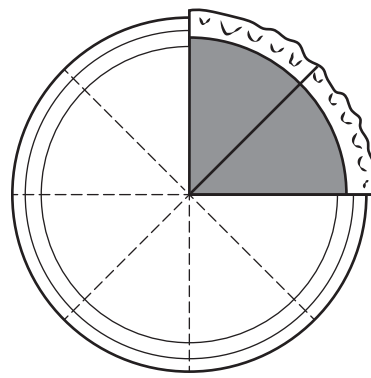
Maureen thinks she used more total gallons of paint to paint all her furniture than Ken used to paint all his furniture.

- c. Use words or numbers to explain whether Maureen is correct.



- 15.** Jan claims that since every square has four right angles, every rhombus must also have four right angles. Which statement **best** describes Jan's claim?
- A** Jan is correct because every square is a rhombus.
- B** Jan is correct because every rhombus is a square.
- C** Jan is incorrect because not every square is a rhombus.
- D** Jan is incorrect because not every rhombus is a square.

16. Mrs. Dorame cut a pie into 8 equal slices. She gave $\frac{1}{4}$ of the pie to her neighbor, and she ate $\frac{1}{8}$ of the pie. Which picture shows how much of the pie Mrs. Dorame has left?

A**B****C****D**SESSION
1

17. A word problem is shown.

Anquan's brother is $\frac{3}{4}$ yard tall. Anquan is $2\frac{1}{4}$ times as tall as his brother.

Based on this information, how many yards tall is Anquan?

Which equation represents the solution to this problem?

A $\frac{3}{4} \times \frac{4}{9} = \frac{12}{36}$

B $\frac{3}{4} \times \frac{9}{4} = \frac{27}{16}$

C $\frac{4}{3} \times \frac{9}{4} = \frac{36}{12}$

D $\frac{4}{3} \times \frac{4}{9} = \frac{16}{27}$

SESSION

1

18. Marco is using this equation to determine the quotient of two numbers, a and b .

$$a \div b = \square$$

Neither a nor b is equal to zero.

Which equation shows a way that Marco can check his answer?

A $\square + b = a$

B $\square - b = a$

C $\square \times b = a$

D $\square \div b = a$

Mathematics Session 2

DIRECTIONS



Today you will take a test in mathematics. For this test, you will answer selected-response and constructed-response questions. Some of the questions may look different from test questions you have seen before, and some may ask about material that is new to you, but it is important to do your best. If you are not sure of the answer to a question, you should still try to answer it.

You **MAY** use a calculator to answer the questions in this session.

19. In which direction does the number 5 in the ordered pair $(5, 7)$ tell you to move when starting from the origin?
- A up on the y-axis
 - B down on the y-axis
 - C left on the x-axis
 - D right on the x-axis

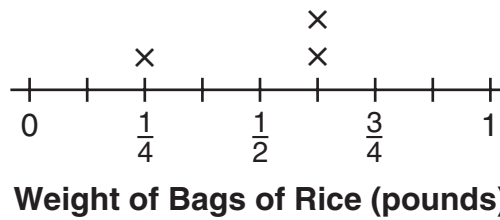
SESSION

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20. Ms. Smith has three bags of rice. She records the weight of each bag of rice on this line plot.

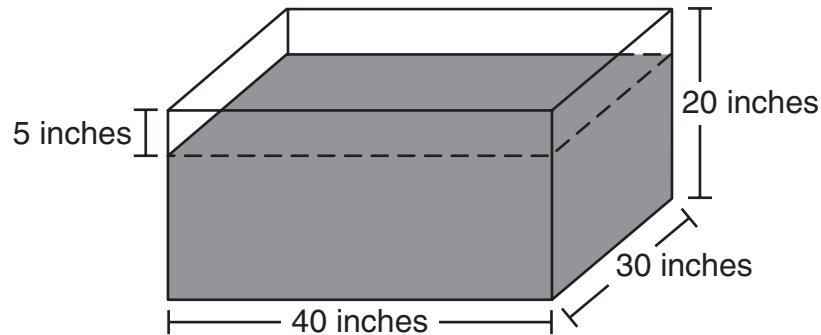


What is the total weight of Ms. Smith's bags of rice?

- A $\frac{7}{8}$ pound
- B $1\frac{1}{4}$ pounds
- C $1\frac{1}{2}$ pounds
- D $1\frac{3}{4}$ pounds



21. Linda is putting soil in a planter that is in the shape of a rectangular prism. She will leave a 5-inch space between the soil and the top of the planter, as shown.



What is the volume of the soil Linda will put into the planter?

- A 15,000 cubic inches
- B 18,000 cubic inches
- C 24,000 cubic inches
- D 30,000 cubic inches

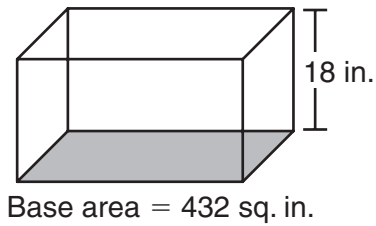


22. Which situation is **best** represented by the expression $(24 - 3) \div 7$?

- A There are 24 students in Mr. Lane's class. Three students are absent. Mr. Lane divides the students who are present into 7 equal groups.
- B There are 24 students in Mr. Lane's class. Seven students are absent. Mr. Lane divides the students who are present into 3 equal groups.
- C There were 24 students in Mr. Lane's class. Three new students joined the class. Mr. Lane divides the students who are present into 7 equal groups.
- D There are 21 students in Mr. Lane's class. Mr. Lane divides the students into 3 equal groups.



- 23.** Marina bought an aquarium in the shape of a rectangular prism with the measures shown.

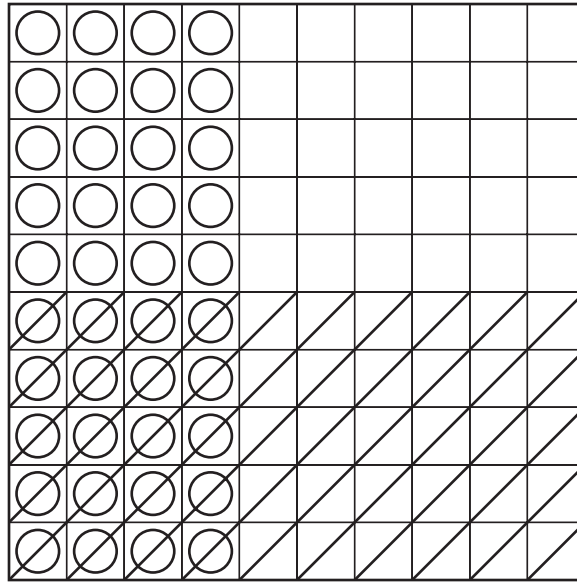


Which statement about the volume of the aquarium is true?

- A** The volume can be calculated by dividing the base area by the height.
- B** The volume can be calculated by multiplying the base area by the height.
- C** The volume cannot be calculated, because the base area is not measured in cubic units.
- D** The volume cannot be calculated, because the length and width of the aquarium are unknown.



- 24.** Curt marked this hundredths grid to represent a mathematical expression.



Key

Each = 0.01

SESSION

2

Which expression is **best** represented on the hundredths grid?

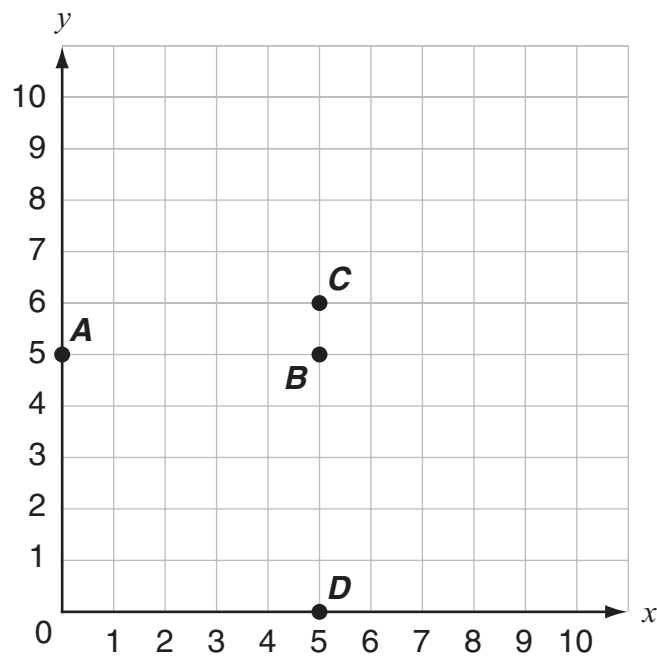
- A** $20 + 40$
B $50 - 40$
C 0.4×0.5
D $0.4 \div 0.2$

This question has two parts. Be sure to answer all parts of the question.

- 25.** The mass of an object is forty-one and seven hundred nine thousandths kilograms.
- Write the mass in number form.
 - Write a number sentence using $>$, $<$, or $=$ to compare the number you wrote in part (a) and the number 41.097. Use words or numbers to explain why your comparison is correct.



26. Four points are plotted on this coordinate grid.



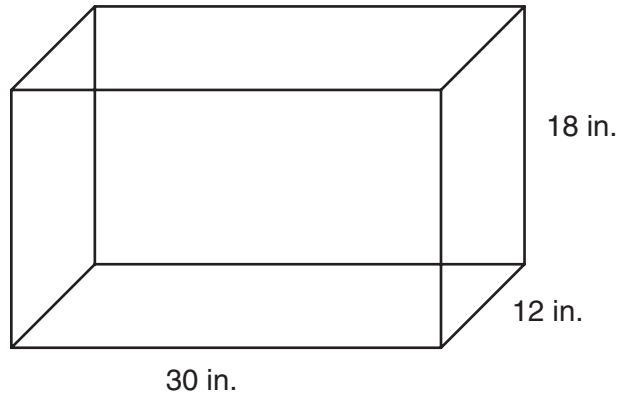
Which plotted point has x- and y-coordinates that are the same?

- A point A
- B point B
- C point C
- D point D



Use the information below to answer questions 27 and 28.

This drawing shows the dimensions, in inches, of Brett's rectangular fish tank.



27. Brett puts the fish tank on a shelf that is $6\frac{1}{2}$ feet long. The longest side of the fish tank goes along the length of the shelf.

How many **inches** longer is the shelf than the fish tank?

- A $23\frac{1}{2}$ inches
B 35 inches
C $42\frac{1}{2}$ inches
D 48 inches



28. What is the volume, in cubic inches, of Brett's fish tank?

- A** 540
- B** 2,232
- C** 6,480
- D** 9,720

29. Mary measured 6 cups of flour by filling a $\frac{1}{2}$ -cup measuring cup several times.

Which expression can be used to find the number of times Mary filled the $\frac{1}{2}$ -cup measuring cup?

- A** $\frac{1}{2} + 6$
- B** $\frac{1}{2} \times 6$
- C** $6 - \frac{1}{2}$
- D** $6 \div \frac{1}{2}$



30. Hugo creates two patterns to show the values for Pattern A, (x) , and for Pattern B, (y) , as shown.

| Pattern A (x) | Pattern B (y) |
|----------------------|----------------------|
| 1 | 7 |
| 2 | 8 |
| 3 | 9 |
| ? | ? |

Hugo extends his patterns. He makes ordered pairs (x, y) using corresponding terms from Pattern A and Pattern B.

Which ordered pair (x, y) could Hugo write from his patterns?

- A (8, 13)
- B (8, 15)
- C (9, 14)
- D (9, 15)



31. Michael lists the properties of all parallelograms.

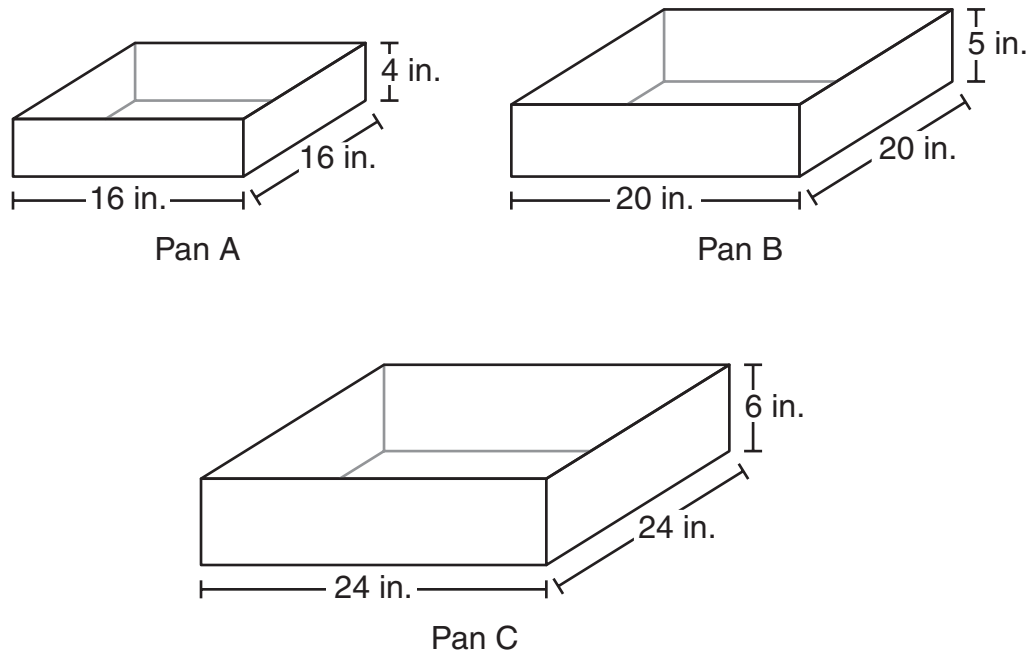
Which statements are true? Select the **two** true statements.

- A Every square has all the properties of a parallelogram.
- B Every polygon has all the properties of a parallelogram.
- C Every rectangle has all the properties of a parallelogram.
- D Every trapezoid has all the properties of a parallelogram.
- E Every quadrilateral has all the properties of a parallelogram.



This question has three parts. Be sure to answer all parts of the question.

- 32.** Elana will bake a three-layer cake using these square-shaped pans.



- What is the volume, in cubic inches, of pan C? Use words or numbers to explain your answer.
- Elana completely filled all three pans with cake batter. What is the total volume, in cubic inches, of the cake batter she used? Use words or numbers to explain your answer.

Elana plans to bake another three-layer cake. The lengths and widths of the pans are the same but the height of each pan is 1 inch less than the pans she used for her first cake. Elana completely filled all three pans with cake batter.

- Based on the measurements of the cake pans, what is the difference, in cubic inches, between the total volume of the batter Elana used for the first cake and the total volume of the batter she used for the second cake? Use words or numbers to explain your answer.



- 33.** Lawrence poured 95 milliliters of milk from a full 1-liter bottle.

What is the amount of milk remaining in the bottle?

- A** 5.0 milliliters
- B** 9.05 milliliters
- C** 50 milliliters
- D** 905 milliliters

- 34.** A division equation is shown.

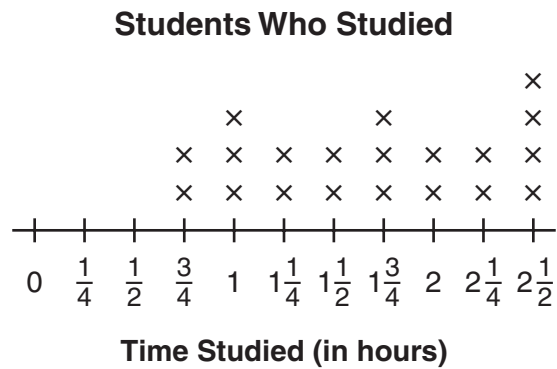
$$\frac{1}{4} \div 3 = y$$

Which multiplication equation has the same solution for y as the division equation?

- A** $y \times 3 = \frac{1}{4}$
- B** $\frac{1}{4} \times 3 = y$
- C** $y \times \frac{1}{4} = 3$
- D** $4 \times \frac{1}{3} = y$



35. The line plot shows the number of hours that students in Mr. Costa's class studied last week.

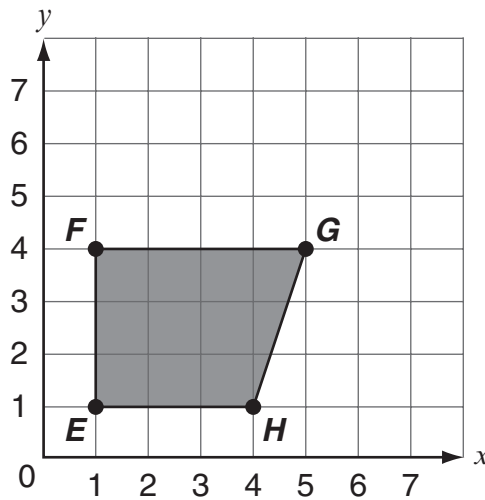


What is the difference between the greatest number of hours studied and the least number of hours studied?

- A** $1\frac{1}{4}$ hours
- B** $1\frac{3}{4}$ hours
- C** $2\frac{1}{4}$ hours
- D** $2\frac{1}{2}$ hours



36. Quadrilateral $FGHE$ is shown on a coordinate grid.



Which ordered pair is located **inside** quadrilateral $FGHE$?

- A (1, 3)
- B (3, 4)
- C (4, 3)
- D (5, 3)



37. Stella is adding two fractions, as shown.

$$\frac{3}{5} + \frac{2}{7} = ? = \frac{31}{35}$$

Which sum can replace the ? to make the equation true?

- A $\frac{21}{5} + \frac{10}{7}$
- B $\frac{21}{10} + \frac{10}{25}$
- C $\frac{21}{23} + \frac{10}{15}$
- D $\frac{21}{35} + \frac{10}{35}$



NM-MSSA Math

PRACTICE TEST ANSWER KEY

Grade 5

| Item Number | Key | Standards |
|-------------|-----|---|
| 1 | D | 5.NF.A.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.</i> |
| 2 | A,E | 5.NBT.A.3 Read, write, and compare decimals to thousandths. 5.NBT.A.3.B Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons. |
| 3 | B | 5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. 5.NF.B.4.B Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. |
| 4 | B | 5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. |
| 5 | C | 5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. |
| 6 | B | 5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. |
| 7 | | 5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. <i>For example, express the calculation "add 8 and 7, then multiply by 2" as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.</i> |

Practice Test Answer Key • Grade 5 Math

| Item Number | Key | Standards |
|-------------|-----|--|
| 8 | B | <p>5.NF.B.3</p> <p>Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. <i>For example, interpret $3/4$ as the result of dividing 3 by 4, noting that $3/4$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?</i></p> |
| 9 | B | <p>5.NBT.A.2</p> <p>Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.</p> |
| 10 | D | <p>5.NF.B.6</p> <p>Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.</p> |
| 11 | C | <p>5.NBT.A.2</p> <p>Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.</p> |
| 12 | C | <p>5.NBT.A.2</p> <p>Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.</p> |
| 13 | A | <p>5.OA.B.3</p> <p>Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. <i>For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.</i></p> |
| 14 | | <p>5.NF.A.2</p> <p>Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.</i></p> |
| 15 | D | <p>5.G.B.3</p> <p>Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.</p> |

Practice Test Answer Key • Grade 5 Math

| Item Number | Key | Standards |
|-------------|-----|--|
| 16 | B | <p>5.NF.A.2</p> <p>Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.</i></p> |
| 17 | B | <p>5.NF.B.6</p> <p>Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.</p> |
| 18 | C | <p>5.NBT.B.6</p> <p>Find whole-number quotients of whole numbers with up to four-digit dividends and two-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.</p> |
| 19 | D | <p>5.G.A.1</p> <p>Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).</p> |
| 20 | C | <p>5.MD.B.2</p> <p>Make a line plot to display a data set of measurements in fractions of a unit ($1/2$, $1/4$, $1/8$). Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.</i></p> |
| 21 | B | <p>5.MD.C.5</p> <p>Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>5.MD.C.5.B</p> <p>Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.</p> |
| 22 | A | <p>5.OA.A.2</p> <p>Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. <i>For example, express the calculation "add 8 and 7, then multiply by 2" as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.</i></p> |

Practice Test Answer Key • Grade 5 Math

| Item Number | Key | Standards |
|-------------|-----|--|
| 23 | B | <p>5.MD.C.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>5.MD.C.5.A Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths,</p> |
| 24 | C | <p>5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.</p> |
| 25 | | <p>5.NBT.A.3 Read, write, and compare decimals to thousandths.</p> |
| 26 | B | <p>5.G.A.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).</p> |
| 27 | D | <p>5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.</p> |
| 28 | C | <p>5.MD.C.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>5.MD.C.5.B Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.</p> |
| 29 | D | <p>5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.¹</p> <p>5.NF.B.7.C Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, how much chocolate will each person get if 3 people share $\frac{1}{2}$ lb of chocolate equally? How many $\frac{1}{3}$-cup servings are in 2 cups of raisins?</i></p> <p>¹ Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.</p> |

Practice Test Answer Key • Grade 5 Math

| Item Number | Key | Standards |
|-------------|-----|---|
| 30 | D | <p>5.OA.B.3</p> <p>Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. <i>For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.</i></p> |
| 31 | A,C | <p>5.G.B.3</p> <p>Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.</p> |
| 32 | | <p>5.MD.C.5</p> <p>Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <p>5.MD.C.5.C</p> <p>Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.</p> |
| 33 | D | <p>5.MD.A.1</p> <p>Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.</p> |
| 34 | A | <p>5.NF.B.7</p> <p>Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.¹</p> <p>¹ Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.</p> |
| 35 | B | <p>5.MD.B.2</p> <p>Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.</i></p> |
| 36 | C | <p>5.G.A.2</p> <p>Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.</p> |
| 37 | D | <p>5.NF.A.1</p> <p>Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)</i></p> |

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#7

Response Processing:

Rubric Block: ID:1 Author, Scorer, Test-creator, Tutor

Concepts and Procedures Scoring Rubric

| Score | Description |
|-------|-------------------------|
| 2 | Student earns 2 points. |
| 1 | Student earns 1 point. |
| 0 | Student earns 0 points. |
| Blank | No response |

Concepts and Procedures Training Notes:

2 points for two correct expressions, $(12 - 4) \times 6$ and $6 \times (12 - 4)$, or equivalent

OR

1 point for one correct expression

Rubric Block: ID:1 Author, Scorer, Test-creator, Tutor

Mathematical Practices Scoring Rubric

| Score | Description |
|-------|-------------------------|
| 1 | Student earns 1 point. |
| 0 | Student earns 0 points. |
| Blank | No response |

Mathematical Practices Training Notes:

1 point for using mathematical properties of numbers, operations, and equality to explain and analyze mathematical problems (explains why both expressions represent the same calculation)

Rubric Block: Author, Scorer, Test-creator, Tutor

Exemplary Response:

$(12 - 4) \times 6$ and $6 \times (12 - 4)$

These expressions both subtract 4 from 12 and then are multiplied by 6. Since order does not matter when you multiply, these expressions will give the same value.

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#14

Response Processing:

Rubric Block: Author, Scorer, Test-creator, Tutor
Concepts and Procedures Scoring Rubric:

| Score | Description |
|-------|--|
| 4 | The student earns 4 points. |
| 3 | The student earns 3 points. |
| 2 | The student earns 2 points. |
| 1 | The student earns 1 point. |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

- Part a 2 points for correct answer $1\frac{1}{8}$ (gallons) (or equivalent) with sufficient work to show understanding of adding fractions with unlike denominators
- OR
- 1 point for correct answer with insufficient or no work
- or
- for appropriate strategy to show understanding of adding fractions with unlike denominators with incorrect or no answer
- Part b 1 point for sufficient explanation to show understanding of adding and subtracting fractions with unlike denominators to support answer
- Part c for sufficient explanation to show understanding of adding and subtracting fractions with unlike denominators to support answer

Rubric Block: Author, Scorer, Test-creator, Tutor
Mathematical Practices Scoring Rubric:

| Score | Description |
|-------|--|
| 2 | The student earns 2 points. |
| 1 | The student earns 1 point. |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

- 1 point for making a valid argument (sufficient explanation to show why Ken used more paint)

Practice Test Answer Key • Grade 5 Math

1 point for evaluating an argument (sufficient explanation to show why Maureen is incorrect)

Rubric Block: Author, Scorer, Test-constructor, Tutor

Exemplary Response:

a. $1\frac{1}{8}$ (gallons), $\frac{3}{4} + \frac{3}{8} = \frac{6}{8} + \frac{3}{8} = \frac{9}{8} = 1\frac{1}{8}$

b. Ken used more paint. Maureen used $\frac{15}{16}$ gallon of paint. $\frac{11}{16} + \frac{1}{4} = \frac{11}{16} + \frac{4}{16} = \frac{15}{16}$

$\frac{15}{16}$ is less than a gallon of paint. Ken used more than a gallon so he used more.

c. Maureen is not correct. They used the same amount.

Ken used $1\frac{5}{16}$ (gallons), $1\frac{1}{8} + \frac{3}{16} = 1\frac{2}{16} + \frac{3}{16} = 1\frac{5}{16}$

Maureen used $1\frac{5}{16}$ (gallons), $\frac{15}{16} + \frac{3}{8} = \frac{15}{16} + \frac{6}{16} = \frac{21}{16} = 1\frac{5}{16}$

#25

Response Processing:

Rubric Block: ID:1 Author, Proctor, Scorer, Test-constructor, Tutor

Concepts and Procedures Scoring Rubric

| Score | Description |
|-------|-----------------------------|
| 2 | The student earns 2 points. |
| 1 | The student earns 1 point. |
| 0 | The student earns 0 points. |
| Blank | No response |

Concepts and Procedures Training Notes:

| | | |
|--------|---------|--|
| Part a | 1 point | for correct answer, 41.709 |
| Part b | 1 point | for correct answer, 41.709 > 41.097 (or equivalent) or for correct answer to part b based on an incorrect answer in part a |

Rubric Block: ID:2 Author, Proctor, Scorer, Test-constructor, Tutor

Mathematical Procedures Scoring Rubric

| Score | Description |
|-------|-----------------------------|
| 1 | The student earns 1 point. |
| 0 | The student earns 0 points. |
| Blank | No response |

Mathematical Practices Training Notes

| | |
|---------|---|
| 1 point | for making use of structure (explaining how place value can be used to compare two numbers) |
|---------|---|

Rubric Block: Author, Scorer, Test-constructor, Tutor

Exemplary Response:

a. 41.709

b. $41.709 > 41.097$ OR $41.097 < 41.709$. 41.709 has a 7 in the tenths place and 41.097 has a 0 in the tenths place. Since they both have 41 in the whole number places, I compared 7 tenths to 0 tenths and know that 7 tenths is greater.

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#32

Response Processing:

Rubric Block: Author, Scorer, Test-constructor, Tutor

Concepts and Procedures Scoring Rubric:

| Score | Description |
|-------|--|
| 4 | The student earns 6 points. |
| 3 | The student earns 4 or 5 points. |
| 2 | The student earns 2 or 3 points. |
| 1 | The student earns 1 point. |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

Part a 2 points for correct answer, **3,456 (cubic inches)**, with sufficient work or explanation to indicate understanding of finding the volume of a solid figure

OR

1 point for correct answer with insufficient or no work or explanation

or

for appropriate strategy that shows understanding of finding the volume of a solid figure, with incorrect or no answer

Part b 2 points for correct answer, **6,480 (cubic inches)**, with sufficient work or explanation to indicate understanding of finding the volume of a solid figure composed of non-overlapping right rectangular prisms

OR

1 point for correct answer with insufficient or no work or explanation

or

for appropriate strategy that shows understanding of finding the volume of a solid figure composed of non-overlapping right rectangular prisms, with incorrect or no answer

Part c 2 points for correct answer, **1,232 (cubic inches)**, with sufficient work or explanation to indicate understanding of finding the difference between the total volumes of two solid figures, each composed of non-overlapping right rectangular prisms

OR

1 point for correct answer with insufficient or no work or explanation

or

for appropriate strategy that shows understanding of finding the difference between the total volumes of two solid figures, each composed of non-overlapping right rectangular prisms, with incorrect or no answer

Rubric Block: Author, Scorer, Test-constructor, Tutor

Mathematical Practices Scoring Rubric:

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| Score | Description |
|-------|-----------------------------|
| 2 | The student earns 2 points. |
| 1 | The student earns 1 point. |
| 0 | The student earns 0 points. |
| Blank | No response |

Training Notes:

1 point for abstracting a given situation (correctly determines the volume of the largest layer and the 3-layer cake)

1 point for using quantitative reasoning (correctly determines the difference between the total volumes of two 3-layer cakes)

Rubric Block: Author, Scorer, Test-constructor, Tutor

Exemplary Response:

a. 3,456 (cubic inches); $24 \times 24 \times 6 = 3,456$

b. 6,480 (cubic inches); $24 \times 24 \times 6 = 3,456$; $20 \times 20 \times 5 = 2,000$; $16 \times 16 \times 4 = 1,024$

$3,456 + 2,000 + 1,024 = 6,480$

c. 1,232 (cubic inches); $24 \times 24 \times 5 = 2,880$; $20 \times 20 \times 4 = 1,600$; $16 \times 16 \times 3 = 768$

$2,880 + 1,600 + 768 = 5,248$

$6,480 - 5,248 = 1,232$