



**MATHEMATICS TEST DIRECTIONS**

On the following pages are the mathematics questions.

- You may not use a calculator for question 1. You may use a calculator for all other questions on this test.

**Directions for Multiple-Choice Questions**

Some questions will ask you to select an answer from among four choices.

For the multiple-choice questions:

- First solve the problem on scratch paper.
- Choose the correct answer and record your choice in the answer booklet.
- If none of the choices matches your answer, go back and check your work for possible errors.
- Only one of the answers provided is the correct response.

**Directions for Open-Ended Questions**

Some questions will require you to write your response.

For the open-ended questions:

- These questions have more than one part. Be sure to read the directions carefully.
- You cannot receive the highest score for an open-ended question without completing all tasks in the question. For example, if the question asks you to show your work or explain your reasoning, be sure to show your work or explain your reasoning in the space provided.
- If the question does **not** ask you to show your work or explain your reasoning, you may use the space provided, but only those parts of your response that the question specifically asks for will be scored.
- Write your response in the appropriate location within the response box in the answer booklet. Some answers may require graphing, plotting, labeling, drawing, or shading. If you use scratch paper, be sure to transfer your final response and any needed work or reasoning to the answer booklet.



Question 1 in this sampler is to be solved without the use of a calculator.

## MULTIPLE-CHOICE ITEMS

1. Subtract:  $1.76 - 0.9$

- A. 0.86
- B. 1.26
- C. 1.67
- D. 1.73

Item Information	
Alignment	A-T.2.1.3
Answer Key	A
Depth of Knowledge	1
p-value A	59% (correct answer)
p-value B	8%
p-value C	27%
p-value D	6%
Option Annotations	<p>A. Correct: aligns the decimals before subtracting OR includes a 0 in the hundredths place of 0.9 and then subtracts <math>1.76 - 0.90</math></p> <p>B. subtracts the 7 from the 9</p> <p>C. subtracts 0.09 from 1.76 (right-aligns the numbers before subtracting)</p> <p>D. subtracts 0.09 from 1.76 (right-aligns the numbers before subtracting) and subtracts the 6 from the 9</p>

**A calculator is permitted for use in solving questions 2–17 in this sampler.**

2. The expression below represents the mass, in grams, of a mineral sample.

$$7 \times 10 + 3 \times 0.1 + 9 \times 0.001$$

What is the mass, in grams, of the mineral sample?

- A. seventy and thirty-nine hundredths
- B. seventy-three and nine hundredths
- C. seventy-three and nine thousandths
- D. seventy and three hundred nine thousandths

Item Information	
Alignment	A-T.1.1.3
Answer Key	D
Depth of Knowledge	1
p-value A	15%
p-value B	9%
p-value C	17%
p-value D	59% (correct answer)
Option Annotations	<p>A. treats the last digit as hundredths</p> <p>B. uses 3 in the ones place rather than the tenths place and treats the last digit as hundredths</p> <p>C. uses 3 in the ones place rather than the tenths place</p> <p>D. Correct: recognizes that <math>7 \times 10 = 70</math>, <math>3 \times 0.1 = 0.3</math>, and <math>9 \times 0.001 = 0.009</math>; adds these values together and determines the sum is 70.309; and then uses “seventy” to represent 70 (the digits to the left of the decimal point), “and” to represent the decimal point (separates the whole part of the number from the decimal part of the number), “three hundred nine” to represent 309 (the digits to the right of the decimal point), and “thousandths” since the rightmost digit is in the thousandths place</p>

3. Which statement correctly compares  $2 \times 100 + 4 \times 1 + 5 \times 0.1$  and 204.05?
- A.  $204.5 < 204.05$
  - B.  $204.5 > 204.05$
  - C.  $204.05 = 204.05$
  - D.  $204.005 < 204.05$

Item Information	
Alignment	A-T.1.1.4 A-T.1.1.3
Answer Key	B
Depth of Knowledge	1
p-value A	16%
p-value B	48% (correct answer)
p-value C	32%
p-value D	4%
Option Annotations	<p>A. reverses the inequality symbol</p> <p>B. Correct: recognizes <math>2 \times 100 = 200</math>, <math>4 \times 1 = 4</math>, <math>5 \times 0.1 = 0.5</math>; adds these values together and determines the sum is 204.5; compares the whole-number parts (<math>204 = 204</math>), and then either compares 5 tenths to 0 tenths, recognizing that <math>.5 &gt; .0</math> OR writes 0.5 as 0.50 to compare the decimal parts (<math>0.50 &gt; 0.05</math>)</p> <p>C. uses <math>5 \times 0.1 = 0.05</math> rather than 0.5</p> <p>D. uses <math>5 \times 0.1 = 0.005</math> rather than 0.5</p>

4. A bakery owner orders 6 cases of chocolate. Each case contains 4 blocks of chocolate. Each block weighs 13.2 pounds. How many pounds of chocolate does the bakery owner order?
- A. 58.8
  - B. 83.2
  - C. 103.2
  - D. 316.8

Item Information	
Alignment	A-T.2.1
Answer Key	D
Depth of Knowledge	2
p-value A	13%
p-value B	11%
p-value C	8%
p-value D	68% (correct answer)
Option Annotations	<p>A. multiplies 4 by 13.2 and then adds 6 to the product <math>[4 \times 13.2 + 6]</math></p> <p>B. multiplies 6 by 13.2 and then adds 4 to the product <math>[6 \times 13.2 + 4]</math></p> <p>C. adds 4 to 13.2 and then multiplies the sum by 6 <math>[(4 + 13.2) \times 6]</math></p> <p>D. Correct: multiplies 6 by 4 to determine that the product is 24 blocks of chocolate and then multiplies 24 by 13.2 to determine that the product is 316.8 pounds of chocolate</p>

5. A farmer has 10 packages of corn seeds. Each package contains 300 seeds. He plants all the seeds in 20 rows with an equal number of seeds in each row. How many seeds are in each row?
- A. 150
  - B. 600
  - C. 1,500
  - D. 60,000

Item Information	
Alignment	A-T.2.1.2 A-T.2.1.1
Answer Key	A
Depth of Knowledge	1
p-value A	62% (correct answer)
p-value B	10%
p-value C	8%
p-value D	20%
Option Annotations	<p>A. Correct: multiplies 10 by 300 to determine that the product is 3,000 seeds and then divides 3,000 by 20 to determine that the quotient is 150 seeds in each row</p> <p>B. calculates <math>300 \div 10 \times 20</math></p> <p>C. calculates <math>30 \div 2 \times 100</math></p> <p>D. calculates <math>300 \times 10 \times 20</math></p>



6. Which expression is equivalent to  $\frac{1}{3} + \frac{1}{30} - \frac{1}{5}$ ?

A.  $\frac{1}{3} + \frac{6}{30} - \frac{1}{30}$

B.  $\frac{5}{15} - \frac{3}{15} + \frac{1}{30}$

C.  $\frac{1}{30} + \frac{1}{30} - \frac{1}{5}$

D.  $\frac{5}{15} + \frac{3}{15} - \frac{1}{30}$

Item Information	
Alignment	A-F.1.1.1
Answer Key	B
Depth of Knowledge	2
p-value A	12%
p-value B	51% (correct answer)
p-value C	23%
p-value D	14%
Option Annotations	<p>A. converts <math>\frac{1}{5}</math> to <math>\frac{6}{30}</math> correctly but does not keep the minus sign with the <math>\frac{6}{30}</math> when using the commutative property to change the order of the terms</p> <p>B. Correct: converts <math>\frac{1}{3}</math> to <math>\frac{5}{15}</math> by multiplying both the numerator and the denominator by 5, converts <math>\frac{1}{5}</math> to <math>\frac{3}{15}</math> by multiplying both the numerator and the denominator by 3, and then uses the commutative property to change the order of the terms “<math>-\frac{3}{15}</math>” and “<math>+\frac{1}{30}</math>”</p> <p>C. converts <math>\frac{1}{3}</math> to <math>\frac{1}{30}</math> by multiplying only the denominator by 10</p> <p>D. converts <math>\frac{1}{3}</math> to <math>\frac{5}{15}</math> and <math>\frac{1}{5}</math> to <math>\frac{3}{15}</math> correctly but does not keep the minus sign with the <math>\frac{3}{15}</math> when using the commutative property to change the order of the terms</p>

7. Mrs. Brown has a package containing  $n$  pounds of cereal. Every day she puts  $\frac{1}{8}$  pound of cereal into her son's lunchbox and  $\frac{1}{8}$  pound of cereal into her daughter's lunchbox. Which expression represents the number of days Mrs. Brown can do this before she runs out of cereal?

A.  $(n \times 2) \times \frac{1}{8}$

B.  $(n \times 2) \div \frac{1}{8}$

C.  $n \times \left(2 \times \frac{1}{8}\right)$

D.  $n \div \left(2 \times \frac{1}{8}\right)$

Item Information	
Alignment	A-F.2.1
Answer Key	D
Depth of Knowledge	2
p-value A	17%
p-value B	20%
p-value C	26%
p-value D	37% (correct answer)
Option Annotations	<p>A. doubles the amount because there are two children and multiplies by the daily amount rather than dividing by the daily amount</p> <p>B. doubles the amount because there are two children</p> <p>C. multiplies by the daily amount rather than dividing by the daily amount</p> <p>D. Correct: recognizes that <math>\frac{1}{8}</math> should be multiplied by 2 before dividing the total amount by that product</p>

8. Keira has 8 cups of juice. She pours the juice into 5 glasses, pouring the same amount of juice into each glass. How many cups of juice are in each glass?
- A.  $\frac{5}{8}$
- B.  $1\frac{3}{8}$
- C.  $1\frac{3}{5}$
- D. 3

Item Information	
Alignment	A-F.2.1.1
Answer Key	C
Depth of Knowledge	1
p-value A	29%
p-value B	18%
p-value C	43% (correct answer)
p-value D	10%
Option Annotations	<p>A. divides 5 by 8</p> <p>B. writes the incorrect denominator when converting the improper fraction into a mixed number</p> <p>C. Correct: determines that 8 cups divided among 5 glasses results in 1 with a remainder of 3 and then writes the remainder as the fraction 3 over 5</p> <p>D. subtracts 5 from 8</p>

9. Alli and Bert each have some money. Bert has  $\frac{5}{4}$  as many dollars as Alli has. Which statement about the amount of money Alli and Bert each have is true?
- A. Alli has more money than Bert has.
  - B. Bert has more money than Alli has.
  - C. Alli and Bert have the same amount of money.
  - D. There is not enough information to compare the amount of money Alli and Bert each have.

Item Information	
Alignment	A-F.2.1.3
Answer Key	B
Depth of Knowledge	2
p-value A	15%
p-value B	48% (correct answer)
p-value C	14%
p-value D	23%
Option Annotations	<p>A. does not recognize that <math>\frac{5}{4}</math> is greater than 1 and multiplying any number by a fraction greater than 1 will result in a product larger than either factor</p> <p>B. Correct: recognizes that <math>\frac{5}{4}</math> is greater than 1 and that multiplying any number by a fraction greater than 1 will result in a product larger than either factor</p> <p>C. does not recognize that <math>\frac{5}{4}</math> is greater than 1</p> <p>D. thinks it is not possible to make a comparison about the amount of money either person has since no exact values are given</p>

10. A relay race is  $\frac{1}{8}$  mile long. Each relay team has 4 members. Each team member runs the same distance. How many miles does each team member run?

- A.  $\frac{1}{2}$
- B.  $\frac{1}{4}$
- C.  $\frac{1}{12}$
- D.  $\frac{1}{32}$

Item Information	
Alignment	A-F.2.1.4
Answer Key	D
Depth of Knowledge	2
p-value A	27%
p-value B	15%
p-value C	10%
p-value D	48% (correct answer)
Option Annotations	<p>A. multiplies 4 and <math>\frac{1}{8}</math></p> <p>B. determines the fraction of the race completed by each member [i.e., finds the reciprocal of the number of team members]</p> <p>C. adds 8 and 4</p> <p>D. Correct: recognizes that this situation represents dividing <math>\frac{1}{8}</math> by 4, which is the same as multiplying <math>\frac{1}{8}</math> by <math>\frac{1}{4}</math>, resulting in <math>\frac{1 \times 1}{8 \times 4} = \frac{1}{32}</math></p>



Item Information	
Alignment	C-G.1
Answer Key	C
Depth of Knowledge	2
p-value A	20%
p-value B	18%
p-value C	48% (correct answer)
p-value D	14%
Option Annotations	<p>A. uses Bruce's savings as the <math>x</math>-coordinates and Len's savings as the <math>y</math>-coordinates</p> <p>B. uses Bruce's savings as the <math>y</math>-coordinates and Len's savings as the <math>x</math>-coordinates</p> <p>C. Correct: increases each <math>x</math>-coordinate by 1 since this represents the number of weeks and increases each <math>y</math>-coordinate by 3 since this represents the two brothers saving a total of \$3 each week</p> <p>D. uses the weekly total savings as the <math>x</math>-coordinates and the numbers of weeks as the <math>y</math>-coordinates</p>





Item Information	
Alignment	C-G.1.1.1
Answer Key	C
Depth of Knowledge	1
p-value A	17%
p-value B	13%
p-value C	53% (correct answer)
p-value D	17%
Option Annotations	<p>A. selects two points on the y-axis</p> <p>B. selects two points with the same x-coordinate</p> <p>C. Correct: either selects two points that have the same second coordinate since the second coordinate of an ordered pair represents the y-coordinate OR selects two points on the same horizontal line since the y-coordinate represents the distance from the x-axis</p> <p>D. selects two points that have the x-coordinate and y-coordinate switched</p>



Item Information	
Alignment	C-G.1.1.2
Answer Key	A
Depth of Knowledge	1
p-value A	63% (correct answer)
p-value B	19%
p-value C	12%
p-value D	6%
Option Annotations	<p>A. Correct: recognizes that the <math>x</math>-coordinate represents the amount of time, so uses 5 as the first coordinate of the ordered pair; looks at the line directly above the 5 on the <math>x</math>-axis, sees that it is halfway between the 8 and 12 grid lines, and uses 10 as the second coordinate of the ordered pair since 10 is halfway between 8 and 12</p> <p>B. selects a <math>y</math>-value that is 1 less than 12 (using a <math>y</math>-scale of 2 rather than 4)</p> <p>C. reverses the ordered pair</p> <p>D. selects a <math>y</math>-value that is 1 less than 12 (using a <math>y</math>-scale of 2 rather than 4) and reverses the ordered pair</p>

14. Which term does **not** describe a square?

- A. parallelogram
- B. rectangle
- C. rhombus
- D. trapezoid

Item Information	
Alignment	C-G.2.1.1
Answer Key	D
Depth of Knowledge	1
p-value A	10%
p-value B	10%
p-value C	15%
p-value D	65% (correct answer)
Option Annotations	<p>A. does not account for a parallelogram with 4 right angles and 4 equal sides OR does not recognize that a square is a parallelogram because a square has 2 pairs of parallel sides</p> <p>B. does not account for a rectangle with 4 equal sides OR does not recognize that a square is a rectangle because all 4 angles are right angles</p> <p>C. does not account for a rhombus with 4 right angles OR does not recognize that a square is a rhombus because all 4 sides are equal</p> <p>D. Correct: recognizes that a trapezoid has only 1 pair of parallel sides and that a square has 2 pairs of parallel sides</p>

15. Tracy needs a **gallon** of water, but she has only **quart**-sized, **pint**-sized, and **cup**-sized containers.

- She first fills one **quart**-sized container with water.
- She then fills some **pint**-sized containers and some **cup**-sized containers with water.

How many **pint**-sized containers and **cup**-sized containers could Tracy fill to have a total of 1 **gallon** of water in all the containers?

- A. 1 pint-sized container and 2 cup-sized containers  
 B. 2 pint-sized containers and 1 cup-sized container  
 C. 2 pint-sized containers and 5 cup-sized containers  
 D. 5 pint-sized containers and 2 cup-sized containers

Item Information	
Alignment	D-M.1.1.1
Answer Key	D
Depth of Knowledge	2
p-value A	15%
p-value B	16%
p-value C	31%
p-value D	38% (correct answer)
Option Annotations	<p>A. thinks there are only 2 quarts in a gallon</p> <p>B. thinks there are only 2 quarts in a gallon and confuses cups and pints</p> <p>C. confuses cups and pints</p> <p>D. Correct: either calculates <math>5 \text{ pints} + 2 \text{ cups} = 5 \text{ pints} + 1 \text{ pint} = 6 \text{ pints} = 3 \text{ quarts}</math> and <math>3 \text{ quarts} + 1 \text{ quart} = 4 \text{ quarts} = 1 \text{ gallon}</math> OR calculates <math>1 \text{ gallon} - 1 \text{ quart} = 4 \text{ quarts} - 1 \text{ quart} = 3 \text{ quarts} = 6 \text{ pints} = 5 \text{ pints} + 1 \text{ pint} = 5 \text{ pints} + 2 \text{ cups}</math></p>



Item Information	
Alignment	D-M.3.1.2
Answer Key	B
Depth of Knowledge	2
p-value A	31%
p-value B	40% (correct answer)
p-value C	18%
p-value D	11%
Option Annotations	<p>A. adds the given lengths</p> <p>B. Correct: either recognizes that the prisms have the same width (2 inches), subtracts the length of the taller prism from the overall length to find the length of the shorter prism (<math>4 - 2 = 2</math>), finds the volume of each prism (<math>2 \times 2 \times 4 = 16</math> and <math>2 \times 2 \times 2 = 8</math>), and then adds the volumes to find the total (<math>16 + 8 = 24</math>) OR multiplies the overall length (4), width (2), and height (4) and then subtracts the volume of the “missing” part above the shorter prism (<math>2 \times 2 \times 2 = 8</math>), which is <math>32 - 8 = 24</math></p> <p>C. multiplies the overall length (4), width (2), and height (4) but does not account for the “missing” part above the shorter prism</p> <p>D. multiplies <math>4 \times 4 \times 2</math> to find the volume of the taller prism, multiplies <math>4 \times 2 \times 2</math> to find the volume of the shorter prism, and then adds the volumes to find the total (<math>32 + 16</math>)</p>

## OPEN-ENDED QUESTION

17. Every week, Patrick attends basketball practice for 2 hours on Tuesday and 3 hours on Thursday. Patrick has been attending practice for 6 weeks.

- A. Write a numerical expression with at least one operation symbol to represent the total amount of time Patrick has spent at basketball practice the past 6 weeks.

The expression below represents the number of points Patrick scored in his last basketball game.

$$2 \times (4 + 3) + 3 \times (1 + 2) + 2$$

- B. How many points did Patrick score in his last game? Show or explain all your work.

Go to the next page to finish question 17.

GO ON 





## Item-Specific Scoring Guideline

### #17 Item Information

<b>Alignment</b>	B-O.1.1.1 B-O.1.1.2	<b>Depth of Knowledge</b>	2	<b>Mean Score</b>	1.43
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### Assessment Anchor this item will be reported under:

M05.B-O.1 — Write and interpret numerical expressions.

### Specific Anchor Descriptor addressed by this item:

M05.B-O.1.1 — Analyze and complete calculations by applying the order of operations.

### Scoring Guide

Score	In this item, the student . . .
4	Demonstrates a thorough understanding of how to write and interpret numerical expressions by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of how to write and interpret numerical expressions by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of how to write and interpret numerical expressions by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of how to write and interpret numerical expressions.
0	The response has no correct answer and insufficient evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task. Response may show only information copied from the question.

## Top-Scoring Student Response and Training Notes

Score	Description
4	Student earns 4 points.
3	Student earns 3.0–3.5 points.
2	Student earns 2.0–2.5 points.
1	Student earns 0.5–1.5 points.  OR  Student demonstrates minimal understanding of how to write and interpret numerical expressions.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

## Top-Scoring Response

### Part A (1 point):

1 point for correct answer

OR  $\frac{1}{2}$  point for correct expression as “one side” of equation (e.g.,  $6 \times 5 = 30$ )

Note: No credit for “30” only

What?	Why?
$6 \times (2 + 3)$ <b>OR</b> $6 \times 2 + 6 \times 3$ <b>OR</b> $6 \times 5$  <b>OR equivalent</b>	

### Part B (2 points):

1 point for correct answer

1 point for correct and complete support

OR  $\frac{1}{2}$  point for correct but incomplete support

What?	Why?
25 (points)	<p><b>Sample Work:</b></p> $2 \times (4 + 3) + 3 \times (1 + 2) + 2$ $2 \times 7 + 3 \times 3 + 2$ $14 + 9 + 2 = 25$ <p><b>OR</b></p> <p><b>Sample Explanation:</b></p> <p>First, I simplified the values inside the parentheses (<math>4 + 3 = 7</math> and <math>1 + 2 = 3</math>). Next, I multiplied the two pairs of numbers (<math>2 \times 7 = 14</math> and <math>3 \times 3 = 9</math>). Then, I added the remaining numbers together (<math>14 + 9 + 2 = 25</math>).</p> <p><b>OR equivalent</b></p>

**Part C (1 point):**

1 point for correct and complete explanation

OR  $\frac{1}{2}$  point for correct but incomplete explanation

What?	Why?
	<p><b>Sample Explanation:</b> Two-point shots equal 20 because <math>(4 + 6)</math> is multiplied by 2. Three-point shots equal 15 because <math>(2 + 3)</math> is multiplied by 3. 20 is not twice as large as 15.</p> <p><b>OR equivalent</b></p>

## STUDENT RESPONSE

Response Score: 4 points



## PARTS A and B

Question 17  
Page 1 of 2

Every week, Patrick attends basketball practice for 2 hours on Tuesday and 3 hours on Thursday. Patrick has been attending practice for 6 weeks.

A. Write a numerical expression with at least one operation symbol to represent the total amount of time Patrick has spent at basketball practice the past 6 weeks.

$(2+3) \times 6$

The expression below represents the number of points Patrick scored in his last basketball game.

$$2 \times (4 + 3) + 3 \times (1 + 2) + 2$$

B. How many points did Patrick score in his last game? Show or explain all your work.

PEMDAS  
 $2 \times (4+3) + 3 \times (1+2) + 2$   
 $2 \times 7 + 3 \times (1+2) + 2$   
 $(2 \times 7) + 3 \times 3 + 2$   
 $14 + (3 \times 3) + 2$   
 $(14+9) + 2$   
 $(23+2)$   
 $25$   
 Patrick scored 25 points his last game.

120 / 1000

Review/End Test Pause Flag Options Next

Part A. The student provided a correct expression  $[(2+3) \times 6]$ , with the sum  $(2 + 3)$  representing the total amount of time spent at basketball practice each week, which is then multiplied by the number of weeks (6). [1 point]

Part B. The student provided the correct answer (*Patrick scored 25 points his last game.*) with correct and complete support. The work provided shows that the student used PEMDAS to determine the order of operations in solving: first parentheses  $[2 \times (4+3) + 3 \times (1+2) + 2 \dots (2 \times 7) + 3 \times 3 + 2]$ , then multiplication  $[(2 \times 7) + 3 \times 3 + 2 \dots (14+9) + 2]$ , and finally addition  $[(14+9) + 2 \dots 25]$ . [2 points]

## PART C

Question 17

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Item ID



Every week, Patrick attends basketball practice for 2 hours on Tuesday and 3 hours on Thursday. Patrick has been attending practice for 6 weeks.

During another game, Patrick scored points by making 2-point shots and by making 3-point shots. The two expressions below represent the number of points he scored from making 2-point shots and the number of points he scored from making 3-point shots.

$$\text{2-point shots: } 2 \times (4 + 6)$$

$$\text{3-point shots: } 3 \times (2 + 3)$$

Patrick claims he scored twice as many points from making 2-point shots as from making 3-point shots since  $4 + 6$  is twice as large as  $2 + 3$ .

C. Explain why Patrick's claim is **not** correct even though  $4 + 6$  is twice as large as  $2 + 3$ .

EQ

Patrick's claim is not correct because you would still have to multiply 2 to the  $(4+6)$  and 3 to the  $(2+3)$ . Which makes his 2-point shots: 20, and his 3-point shots: 15. 20 is not twice as many as 15.

200 / 1000

Review/End Test

Pause

Flag



Options

Back

Next

Part C. The student provided a correct and complete explanation as to why Patrick's claim is not correct. It references the multipliers [*you would still have to multiply 2 to the  $(4+6)$  and 3 to the  $(2+3)$* ], evaluates the expressions to get 20 and 15 [*Which makes his 2-point shots: 20, and his 3-point shots: 15*], and then makes a correct comparison between the two point totals [*20 is not twice as many as 15*]. [1 point]







## STUDENT RESPONSE

Response Score: 2 points



## PARTS A and B

Question 17  
Page 1 of 2

Every week, Patrick attends basketball practice for 2 hours on Tuesday and 3 hours on Thursday. Patrick has been attending practice for 6 weeks.

A. Write a numerical expression with at least one operation symbol to represent the total amount of time Patrick has spent at basketball practice the past 6 weeks.

EQ

$2 \times 3 + 6 = 12$

The expression below represents the number of points Patrick scored in his last basketball game.

$$2 \times (4 + 3) + 3 \times (1 + 2) + 2$$

B. How many points did Patrick score in his last game? Show or explain all your work.

EQ

$2 \times (4 + 3) + 3 \times (1 + 2) + 2$   
 $2 \times 7 + 3 \times (1 + 2) + 2$   
 $2 \times 7 + 3 \times 3 + 2$   
 $14 + 3 \times 3 + 2$   
 $14 + 9 + 2$   
 $23 + 2 = 25$

110 / 1000

Review/End Test Pause Flag Options Next

Part A. The student provided an incorrect answer in the form of an equation ( $2 \times 3 + 6 = 12$ ) rather than an expression. The left side of the equation provided is incorrect: the student switched the multiplication sign and the addition sign and did not include grouping symbols around the 2 and 3. [0 points]

Part B. The student provided a correct answer (25) with correct and complete support. The work provided shows the student used the order of operations correctly to calculate the given expression's total: first parentheses [ $2 \times (4 + 3) + 3 \times (1 + 2) + 2 \rightarrow 2 \times 7 + 3 \times (1 + 2) + 2$ ], then multiplication ( $2 \times 7 + 3 \times 3 + 2 \rightarrow 14 + 3 \times 3 + 2$ ), and finally addition ( $14 + 9 + 2 \rightarrow 23 + 2 = 25$ ). [2 points]

## PART C

Question 17  
Page 2 of 2

Item ID ?

Every week, Patrick attends basketball practice for 2 hours on Tuesday and 3 hours on Thursday. Patrick has been attending practice for 6 weeks.

During another game, Patrick scored points by making 2-point shots and by making 3-point shots. The two expressions below represent the number of points he scored from making 2-point shots and the number of points he scored from making 3-point shots.

$$\text{2-point shots: } 2 \times (4 + 6)$$

$$\text{3-point shots: } 3 \times (2 + 3)$$

Patrick claims he scored twice as many points from making 2-point shots as from making 3-point shots since  $4 + 6$  is twice as large as  $2 + 3$ .

C. Explain why Patrick's claim is **not** correct even though  $4 + 6$  is twice as large as  $2 + 3$ .

EQ

he did not solve  $4 + 6$ .

23 / 1000

Review/End Test

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Part C. The student provided an incorrect explanation (*he did not solve  $4 + 6$* ) that did not include referencing the multipliers, evaluating the expressions to get 20 and 15, or making a comparison between the two point totals. [0 points]





## STUDENT RESPONSE

Response Score: 0 points



## PARTS A and B

Question 17  
Page 1 of 2

Every week, Patrick attends basketball practice for 2 hours on Tuesday and 3 hours on Thursday. Patrick has been attending practice for 6 weeks.

**A.** Write a numerical expression with at least one operation symbol to represent the total amount of time Patrick has spent at basketball practice the past 6 weeks.

$2 \times 3 \div 6 = 36$

The expression below represents the number of points Patrick scored in his last basketball game.

$$2 \times (4 + 3) + 3 \times (1 + 2) + 2$$

**B.** How many points did Patrick score in his last game? Show or explain all your work.

$2 \times (4 + 3) + 3 \times (1 + 2) + 2$   
 $4 + 3 \times 1 + 2 \times 2 + 3 = 14$

32 / 1000

Review/End Test Pause Flag Options Next

Part A. The student provided an incorrect answer in the form of an equation ( $2 \times 3 \div 6 = 36$ ). The left side of the equation provided is incorrect: the student used a multiplication sign between 2 and 3 rather than an addition sign, did not put grouping symbols around the 2 and 3, and then divided the total by 6 rather than multiplying the total by 6. The right side of the equation (36) does not match the expression on the left side, which has a value of 1. [0 points]

Part B. The student provided an incorrect answer (14) with incorrect support. The student rewrote the given expression and then incorrectly reordered the expression ( $4 + 3 \times 1 + 2 \times 2 + 3$ ), resulting in an incorrect answer of 14. [0 points]

## PART C

Question 17

Page 2 of 2



Item ID ?

Every week, Patrick attends basketball practice for 2 hours on Tuesday and 3 hours on Thursday. Patrick has been attending practice for 6 weeks.

During another game, Patrick scored points by making 2-point shots and by making 3-point shots. The two expressions below represent the number of points he scored from making 2-point shots and the number of points he scored from making 3-point shots.

2-point shots:  $2 \times (4 + 6)$

3-point shots:  $3 \times (2 + 3)$

Patrick claims he scored twice as many points from making 2-point shots as from making 3-point shots since  $4 + 6$  is twice as large as  $2 + 3$ .

C. Explain why Patrick's claim is **not** correct even though  $4 + 6$  is twice as large as  $2 + 3$ .

EQ  
Patrick's is not correct because  $2 \times 4 + 6 = 14$  and  $3 \times 4 + 6 = 18$   
add that that together and you get 18.

106 / 1000

Review/End Test

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Part C. The student provided an incorrect explanation (*Patrick's is not correct because  $2 \times 4 + 6 = 14$  and  $3 \times 4 + 6 = 18$  add that that together and you get 18*). The student has incorrectly calculated the total points for 2-point shots by not distributing the 2 to both the 4 and the 6. The expression for the 3-point shots is also incorrectly rewritten (using  $4 + 6$  rather than  $2 + 3$ ) and incorrectly calculated (not distributing the 3 to both numbers). The student did not make any references to the multipliers and did not make a comparison between the two point totals. [0 points]

## MATHEMATICS—SUMMARY DATA

## Multiple-Choice

Sample Number	Alignment	Answer Key	Depth of Knowledge	p-value A	p-value B	p-value C	p-value D
1	A-T.2.1.3	A	1	59%	8%	27%	6%
2	A-T.1.1.3	D	1	15%	9%	17%	59%
3	A-T.1.1.4 A-T.1.1.3	B	1	16%	48%	32%	4%
4	A-T.2.1	D	2	13%	11%	8%	68%
5	A-T.2.1.2 A-T.2.1.1	A	1	62%	10%	8%	20%
6	A-F.1.1.1	B	2	12%	51%	23%	14%
7	A-F.2.1	D	2	17%	20%	26%	37%
8	A-F.2.1.1	C	1	29%	18%	43%	10%
9	A-F.2.1.3	B	2	15%	48%	14%	23%
10	A-F.2.1.4	D	2	27%	15%	10%	48%
11	C-G.1	C	2	20%	18%	48%	14%
12	C-G.1.1.1	C	1	17%	13%	53%	17%
13	C-G.1.1.2	A	1	63%	19%	12%	6%
14	C-G.2.1.1	D	1	10%	10%	15%	65%
15	D-M.1.1.1	D	2	15%	16%	31%	38%
16	D-M.3.1.2	B	2	31%	40%	18%	11%

## Open-Ended

Sample Number	Alignment	Points	Depth of Knowledge	Mean Score
17	B-O.1.1.1 B-O.1.1.2	4	2	1.43