

2023 MCAS Sample Student Work and Scoring Guide

Grade 6 Mathematics

Question 14: Constructed-Response

Reporting Category: Geometry

Standard: [6.G.A.1](#) - Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

Item Description: Solve mathematical problems that involve decomposing a figure into a right triangle and a trapezoid to determine the total area of the figure.

Calculator: Not allowed

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Scoring Guide

Select a score point in the table below to view the sample student response.

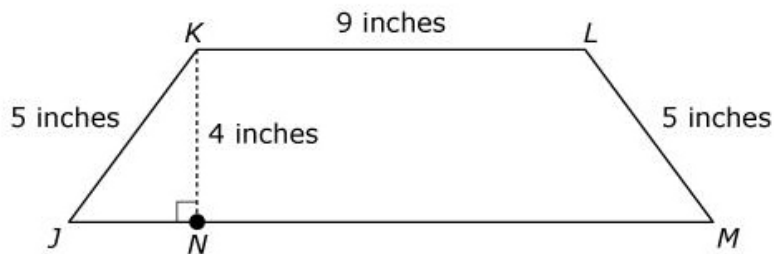
Score*	Description
4A	The student response demonstrates an exemplary understanding of the Geometry concepts involved in finding the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes, and applying these techniques in the context of solving real-world and mathematical problems. The student decomposes a figure and finds its area.
4B	
3	The student response demonstrates a good understanding of the Geometry concepts involved in finding the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes, and applying these techniques in the context of solving real-world and mathematical problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points.
2	The student response demonstrates a fair understanding of the Geometry concepts involved in finding the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes, and applying these techniques in the context of solving real-world and mathematical problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Geometry concepts involved in finding the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes, and applying these techniques in the context of solving real-world and mathematical problems.
0	The student response contains insufficient evidence of an understanding of the Geometry concepts involved in finding the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes, and applying these techniques in the context of solving real-world and mathematical problems. As a result, the response does not merit any points.

*Letters are used to distinguish between sample student responses that earned the same score (e.g., 4A and 4B).

Score Point 4A

This question has four parts.

Figure $JKLM$ is composed of triangle JKN and trapezoid $KLMN$, as shown.



The base of figure $JKLM$ is 15 inches in length. Line segment JN is 3 inches in length.

Part A

What is the length, in inches, of line segment NM ?

Enter your answer in the space provided.

$$9 + 3 = 12$$

The length of NM is 12 inches.

Part B

What is the area, in square inches, of triangle JKN ? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$(3 \times 4) \div 2 = 6$$

The area of JKN is 6 square inches

Part C

What is the area, in square inches, of trapezoid $KLMN$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$(9 \times 4) + ((4 \times 3) \div 2) = 42$$

The area of $KLMN$ is 42 square inches

Part D

What is the total area, in square inches, of figure $JKLM$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$(9 \times 4) + ((4 \times 3) \div 2) 2 = 48$$

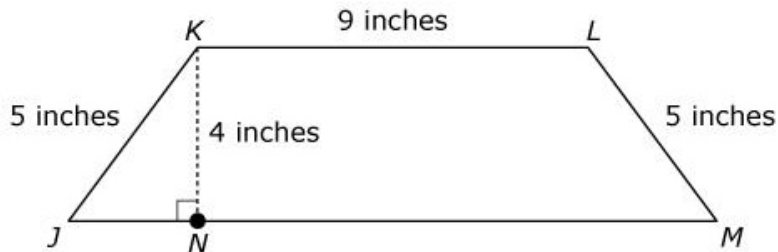
The area of $JKLM$ is 48 square inches

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Score Point 4B

This question has four parts.

Figure $JKLM$ is composed of triangle JKN and trapezoid $KLMN$, as shown.



The base of figure $JKLM$ is 15 inches in length. Line segment JN is 3 inches in length.

Part A

What is the length, in inches, of line segment NM ?

Enter your answer in the space provided.

Line segment NM is 12 inches long.

Part B

What is the area, in square inches, of triangle JKN ? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$\frac{1}{2} \times 3 \times 4 = 6$$

Triangle JKN is 6 square inches.

Part C

What is the area, in square inches, of trapezoid $KLMN$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$\frac{1}{2} \times 4(9 + 12) = 42$$

Trapezoid $KLMN$ is 42 square inches.

Part D

What is the total area, in square inches, of figure $JKLM$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$42 + 6 = 48$$

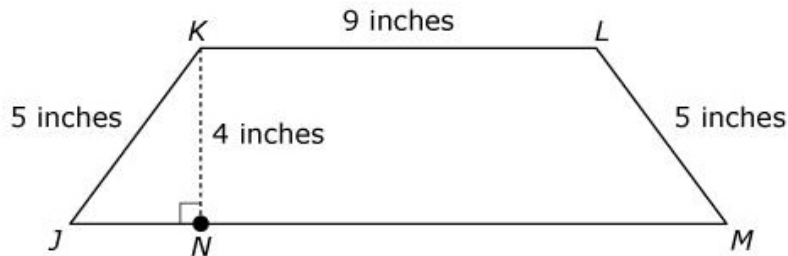
Figure $JKLM$ is 48 square inches.

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Score Point 3

This question has four parts.

Figure $JKLM$ is composed of triangle JKN and trapezoid $KLMN$, as shown.



The base of figure $JKLM$ is 15 inches in length. Line segment JN is 3 inches in length.

Part A

What is the length, in inches, of line segment NM ?

Enter your answer in the space provided.

15 inches.

Part B

What is the area, in square inches, of triangle JKN ? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The area of the the triangle jkn is 6 inches squared I know this because the area formula for a triangle is $A = \frac{1}{2} \times b \times h$. Now I plug my numbers in so the formula looks like this $\frac{1}{2} \times 4 \times 3$ and that equals 6. In counclusion the area of the triangle jkn is 6 inches squared.

Part C

What is the area, in square inches, of trapezoid $KLMN$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The answer is 42 inches I know this because since I know the area of the triangle is 6 inches then I found the area of the rectangle. To do that you multiply $9 \times 4 = 36$ then I added them all together to get 42 inches squared. In conclusion the area of the trapezoid is 42 inches squared.

Part D

What is the total area, in square inches, of figure $JKLM$? Show or explain how you got your answer.

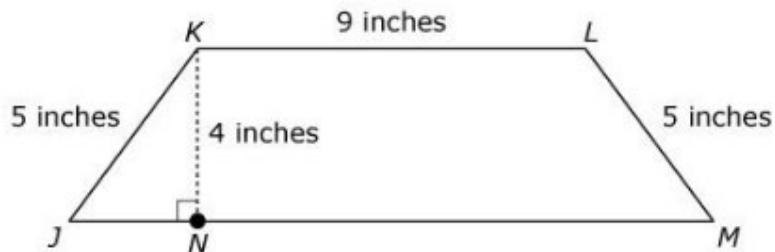
Enter your answer and your work or explanation in the space provided.

The area of the whole trapezoid is 48 inches I know this because the area of $KLMN$ is 42 inches then all I need to do is add the second triangle and since I know that the area of the triangle is 6 inches then all I need to do is add $42 + 6 = 48$. In conclusion the area of the whole trapezoid is 48 inches squared.

Score Point 2

This question has four parts.

Figure $JKLM$ is composed of triangle JKN and trapezoid $KLMN$, as shown.



The base of figure $JKLM$ is 15 inches in length. Line segment JN is 3 inches in length.

Part A

What is the length, in inches, of line segment NM ?

Enter your answer in the space provided.

Part B

What is the area, in square inches, of triangle JKN ? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$a = \frac{1}{2}bh$$

$$a = \frac{1}{2}(3 \times 4)$$

$$a = \frac{1}{2} \times 12$$

$$a = 6 \text{ in}^2$$

Part C

What is the area, in square inches, of trapezoid $KLMN$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$a = bh$$

$$a = 9 \times 4$$

$$a = 36 \text{ in}^2$$

Part D

What is the total area, in square inches, of figure $JKLM$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$a = bh$$

$$a = 15 \times 4$$

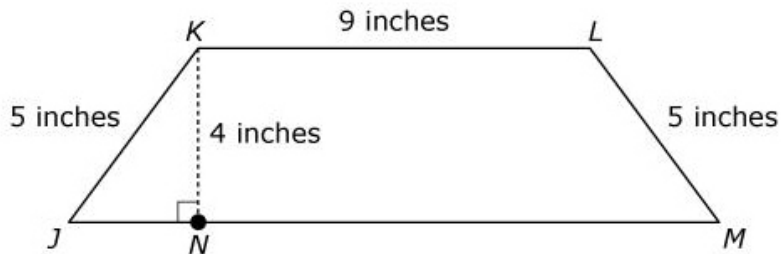
$$a = 60 \text{ in}^2$$

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Score Point 1

This question has four parts.

Figure $JKLM$ is composed of triangle JKN and trapezoid $KLMN$, as shown.



The base of figure $JKLM$ is 15 inches in length. Line segment JN is 3 inches in length.

Part A

What is the length, in inches, of line segment NM ?

Enter your answer in the space provided.

$$9 + 5 - 3 = 11.$$

Part B

What is the area, in square inches, of triangle JKN ? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$(B \cdot H) \div 2 = 3 \cdot 4 = 12 \div 2 = 6 \text{ inches.}$$

Part C

What is the area, in square inches, of trapezoid $KLMN$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$B \cdot H = 11 \cdot 4 = 44.$$

Part D

What is the total area, in square inches, of figure $JKLM$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

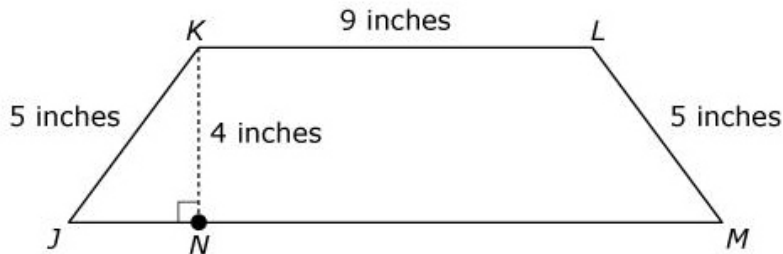
$$B \cdot H = 13 \cdot 4 = 52.$$

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Score Point 0

This question has four parts.

Figure $JKLM$ is composed of triangle JKN and trapezoid $KLMN$, as shown.



The base of figure $JKLM$ is 15 inches in length. Line segment JN is 3 inches in length.

Part A

What is the length, in inches, of line segment NM ?

Enter your answer in the space provided.

The length of line segment NM are 9 inches, because it is parallel to line segment KL which has a length of 9 inches.

Part B

What is the area, in square inches, of triangle JKN ? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The area of the triangle is 18 square inches.

$$\text{area} \square = (b \times h) \div 2$$

$$(4 \times 9) \div 2 = 36 \div 2 = 18$$

Part C

What is the area, in square inches, of trapezoid $KLMN$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The area of the trapezoid is 180 square inches.

$$9 \times 5 \times 4$$

$$45 \times 4 = 180$$

Part D

What is the total area, in square inches, of figure $JKLM$? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The total area of the figure is 225 square inches.

$$5 \times 9 \times 5$$

$$45 \times 5 = 225$$

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