

# 2023 MCAS Sample Student Work and Scoring Guide

## Grade 4 Mathematics

### Question 4: Constructed-Response

**Reporting Category:** Number and Operations-Fractions

**Standard:** [4.NF.A.2](#) - Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as  $\frac{1}{2}$ . Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols  $>$ ,  $=$ , or  $<$ , and justify the conclusions, e.g., by using a visual fraction model.

**Item Description:** Write a fraction comparison using symbols, compare fractions with different denominators, and critique the reasoning of others about different-sized wholes in a word problem.

**Calculator:** Not allowed

[View item in MCAS Digital Item Library](#)

### Scoring Guide

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

Score*	Description
<a href="#">4A</a>	The student response demonstrates an exemplary understanding of the Number and Operations-Fractions concepts involved in comparing two fractions with different numerators and different denominators, recognizing that the comparisons are valid only when the two fractions refer to the same whole, recording the comparisons with symbols, and justifying the conclusions. The student correctly compares fractions, writes a comparison using symbols, and critiques the reasoning of others about different-sized wholes in a word problem.
<a href="#">4B</a>	
<a href="#">3</a>	The student response demonstrates a good understanding of the Number and Operations-Fractions concepts involved in comparing two fractions with different numerators and different denominators, recognizing that the comparisons are valid only when the two fractions refer to the same whole, recording the comparisons with symbols, and justifying the conclusions. 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.
<a href="#">2</a>	The student response demonstrates a fair understanding of the Number and Operations-Fractions concepts involved in comparing two fractions with different numerators and different denominators, recognizing that the comparisons are valid only when the two fractions refer to the same whole, recording the comparisons with symbols, and justifying the conclusions. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
<a href="#">1</a>	The student response demonstrates a minimal understanding of the Number and Operations-Fractions concepts involved in comparing two fractions with different numerators and different denominators, recognizing that the comparisons are valid only when the two fractions refer to the same whole, recording the comparisons with symbols, and justifying the conclusions.
<a href="#">0</a>	The student response contains insufficient evidence of an understanding of the Number and Operations-Fractions concepts involved in comparing two fractions with different numerators and different denominators, recognizing that the comparisons are valid only when the two fractions refer to the same whole, recording the comparisons with symbols, and justifying the conclusions. 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).

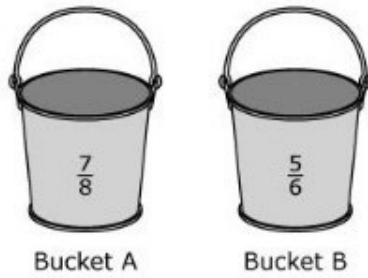
**Score Point 4A**

This question has four parts.

Four friends live in different towns. They each placed a bucket outside to collect rainwater on the same night. The four buckets were labeled A, B, C, and D.

**Part A**

Bucket A and Bucket B are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



Write a number sentence using  $>$ ,  $<$ , or  $=$  to compare the fraction of Bucket A that was filled to the fraction of Bucket B that was filled. Show or explain how you got your answer.

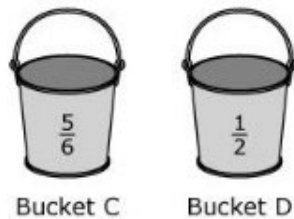
Enter your number sentence and your work or explanation in the space provided.

$$\frac{7}{8} > \frac{5}{6}$$

$$\frac{21}{24} > \frac{20}{24}$$

**Part B**

Bucket C and Bucket D are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



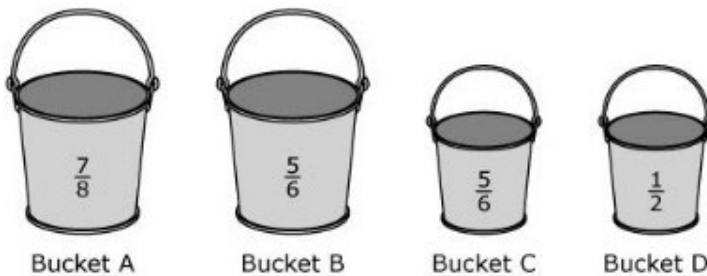
Which bucket, Bucket C or Bucket D, was filled with more rainwater? Explain how you got your answer.

Enter your answer and your explanation in the space provided.

$\frac{5}{6}$  is greater because  $\frac{1}{2}$  would be equivalent to  $\frac{3}{6}$  and that shows  $\frac{5}{6}$  is greater

## Part C

This diagram shows all of the friends' buckets and the fraction of each bucket that was filled with rainwater.



One of the friends says that Bucket B and Bucket C were filled with the same amount of rainwater since  $\frac{5}{6}$  of each bucket was filled with rainwater.

Is the friend correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

The friend is incorrect because even though  $\frac{5}{6}$  and  $\frac{5}{6}$  of each bucket was filled with rainwater, Bucket B is larger.

## Part D

A weatherman in another town says that his town received **less than**  $\frac{1}{2}$  inch of rainwater.

Write a fraction that represents the amount of rainwater, in inches, this town could have received. Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

$\frac{1}{3}$  of an inch because  $\frac{5}{6}$  minus half an inch or  $\frac{3}{6}$  makes a product of  $\frac{2}{6}$  or  $\frac{1}{3}$ .

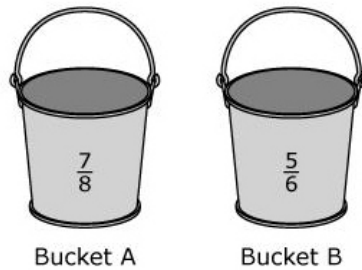
**Score Point 4B**

This question has four parts.

Four friends live in different towns. They each placed a bucket outside to collect rainwater on the same night. The four buckets were labeled A, B, C, and D.

**Part A**

Bucket A and Bucket B are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



Write a number sentence using  $>$ ,  $<$ , or  $=$  to compare the fraction of Bucket A that was filled to the fraction of Bucket B that was filled. Show or explain how you got your answer.

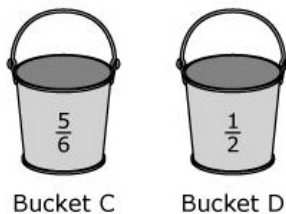
Enter your number sentence and your work or explanation in the space provided.

$$\frac{7}{8} > \frac{5}{6}$$

An eighth is smaller than a sixth. That means if you had only an eighth and a sixth left, the eighth will make a smaller distance between to the whole.

**Part B**

Bucket C and Bucket D are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



Which bucket, Bucket C or Bucket D, was filled with more rainwater? Explain how you got your answer.

Enter your answer and your explanation in the space provided.

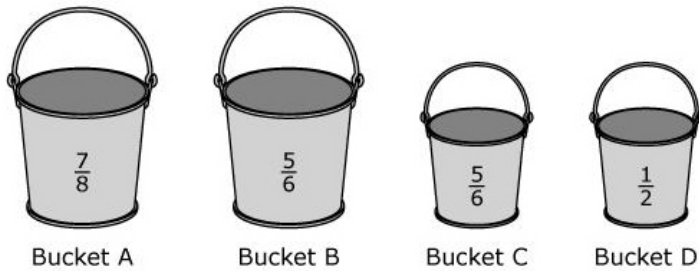
$$\frac{1}{2} = \frac{3}{6}$$

$$\frac{5}{6} > \frac{3}{6}$$

$$\frac{5}{6} > \frac{1}{2}$$

## Part C

This diagram shows all of the friends' buckets and the fraction of each bucket that was filled with rainwater.



One of the friends says that Bucket B and Bucket C were filled with the same amount of rainwater since  $\frac{5}{6}$  of each bucket was filled with rainwater.

Is the friend correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

The friend is incorrect because bucket B is bigger than bucket C. Although they have the same fraction, the fractions are a different size.

## Part D

A weatherman in another town says that his town received **less than**  $\frac{1}{2}$  inch of rainwater.

Write a fraction that represents the amount of rainwater, in inches, this town could have received. Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

The town could have received  $\frac{2}{6}$  inches of rain because  $\frac{1}{2}$  is equal to  $\frac{3}{6}$ , and  $\frac{2}{6}$  is less than  $\frac{3}{6}$ .

[Back to Scoring Guide](#)

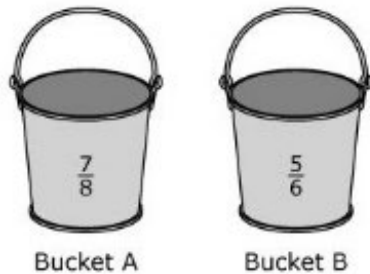
**Score Point 3**

This question has four parts.

Four friends live in different towns. They each placed a bucket outside to collect rainwater on the same night. The four buckets were labeled A, B, C, and D.

**Part A**

Bucket A and Bucket B are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



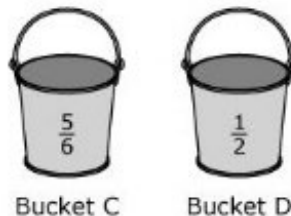
Write a number sentence using  $>$ ,  $<$ , or  $=$  to compare the fraction of Bucket A that was filled to the fraction of Bucket B that was filled. Show or explain how you got your answer.

Enter your number sentence and your work or explanation in the space provided.

$\frac{7}{8} > \frac{5}{6}$  because  $\frac{7}{8} = \frac{42}{48}$  and  $\frac{5}{6} = \frac{40}{48}$  and 42 is greater than 40.

**Part B**

Bucket C and Bucket D are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



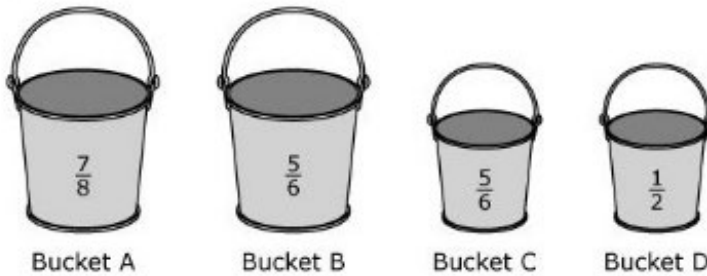
Which bucket, Bucket C or Bucket D, was filled with more rainwater? Explain how you got your answer.

Enter your answer and your explanation in the space provided.

$\frac{5}{6} > \frac{1}{2}$  because  $\frac{1}{2}$  is equal to  $\frac{3}{6}$  and  $\frac{5}{6}$  is greater than  $\frac{3}{6}$ .

**Part C**

This diagram shows all of the friends' buckets and the fraction of each bucket that was filled with rainwater.



One of the friends says that Bucket B and Bucket C were filled with the same amount of rainwater since  $\frac{5}{6}$  of each bucket was filled with rainwater.

Is the friend correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

No because bucket B is bigger than Bucket C and  $\frac{5}{6}$  in bucket C is smaller than  $\frac{5}{6}$  in bucket B.

**Part D**

A weatherman in another town says that his town received **less than**  $\frac{1}{2}$  inch of rainwater.

Write a fraction that represents the amount of rainwater, in inches, this town could have received. Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

0.5 inches because  $\frac{1}{2}$  is equal to 0.5 and 0.5 is half of 1 and  $\frac{1}{2}$  is half of 1 too.

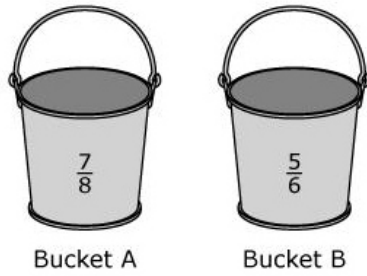
## Score Point 2

This question has four parts.

Four friends live in different towns. They each placed a bucket outside to collect rainwater on the same night. The four buckets were labeled A, B, C, and D.

## Part A

Bucket A and Bucket B are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



Write a number sentence using  $>$ ,  $<$ , or  $=$  to compare the fraction of Bucket A that was filled to the fraction of Bucket B that was filled. Show or explain how you got your answer.

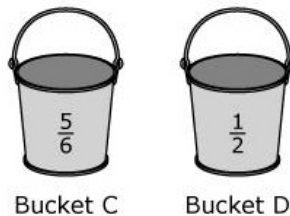
Enter your number sentence and your work or explanation in the space provided.

$$\frac{7}{8} > \frac{5}{6}$$

This is because  $\frac{7}{8}$  has  $\frac{1}{8}$  empty and  $\frac{5}{6}$  has  $\frac{1}{6}$  empty and  $\frac{1}{8} < \frac{1}{6}$  therefor  $\frac{7}{8} > \frac{5}{6}$

## Part B

Bucket C and Bucket D are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



Which bucket, Bucket C or Bucket D, was filled with more rainwater? Explain how you got your answer.

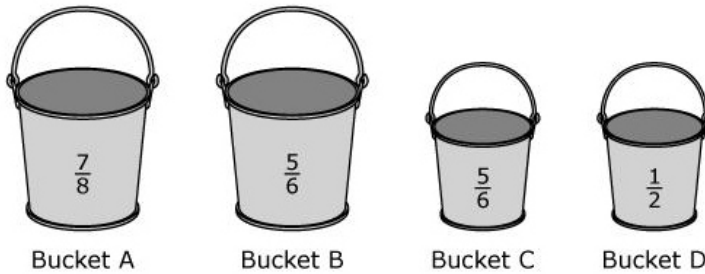
Enter your answer and your explanation in the space provided.

$$\frac{1}{2} = \frac{3}{6} \text{ and } \frac{5}{6} > \frac{3}{6} \text{ so Bucket C} > \text{Bucket D}$$



## Part C

This diagram shows all of the friends' buckets and the fraction of each bucket that was filled with rainwater.



One of the friends says that Bucket B and Bucket C were filled with the same amount of rainwater since  $\frac{5}{6}$  of each bucket was filled with rainwater.

Is the friend correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

The friend is correct because  $\frac{5}{6} = \frac{5}{6}$  and also because  $\frac{5}{6}$  is the same fraction as  $\frac{5}{6}$ .

## Part D

A weatherman in another town says that his town received **less than**  $\frac{1}{2}$  inch of rainwater.

Write a fraction that represents the amount of rainwater, in inches, this town could have received. Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

$$\frac{5}{6} = \frac{6}{8}$$

$$\frac{1}{2} = \frac{4}{8}$$

$$\frac{6}{8} + \frac{4}{8} + \frac{6}{8} + \frac{7}{8} = 2 \frac{7}{8}$$

$$2 \frac{7}{8} = \frac{23}{8}$$

The rain that the town resived was  $\frac{23}{8}$

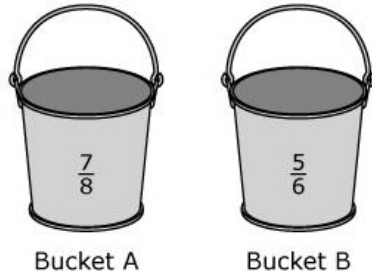
**Score Point 1**

This question has four parts.

Four friends live in different towns. They each placed a bucket outside to collect rainwater on the same night. The four buckets were labeled A, B, C, and D.

**Part A**

Bucket A and Bucket B are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



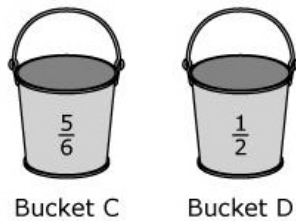
Write a number sentence using  $>$ ,  $<$ , or  $=$  to compare the fraction of Bucket A that was filled to the fraction of Bucket B that was filled. Show or explain how you got your answer.

Enter your number sentence and your work or explanation in the space provided.

$$\frac{7}{8} > \frac{5}{6} \text{ I did } \frac{7}{8} = \frac{21}{24} \quad \frac{5}{6} = \frac{20}{24}$$

**Part B**

Bucket C and Bucket D are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



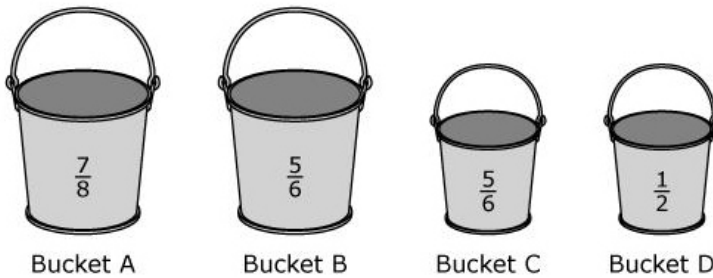
Which bucket, Bucket C or Bucket D, was filled with more rainwater? Explain how you got your answer.

Enter your answer and your explanation in the space provided.

$$\frac{1}{2} \text{ because } \frac{1}{2} \text{ is bigger than } \frac{5}{6}$$

**Part C**

This diagram shows all of the friends' buckets and the fraction of each bucket that was filled with rainwater.



One of the friends says that Bucket B and Bucket C were filled with the same amount of rainwater since  $\frac{5}{6}$  of each bucket was filled with rainwater.

Is the friend correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

Yes because bucket B and bucket C both have  $\frac{5}{6}$  on it.

**Part D**

A weatherman in another town says that his town received **less than**  $\frac{1}{2}$  inch of rainwater.

Write a fraction that represents the amount of rainwater, in inches, this town could have received. Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

.5 I know my answer is correct because 1 whole is 1 inch. So have of a inch is .5.

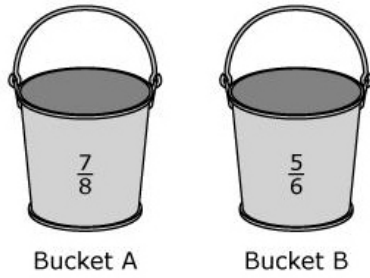
**Score Point 0**

This question has four parts.

Four friends live in different towns. They each placed a bucket outside to collect rainwater on the same night. The four buckets were labeled A, B, C, and D.

**Part A**

Bucket A and Bucket B are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



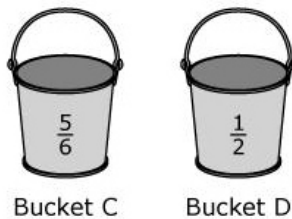
Write a number sentence using  $>$ ,  $<$ , or  $=$  to compare the fraction of Bucket A that was filled to the fraction of Bucket B that was filled. Show or explain how you got your answer.

Enter your number sentence and your work or explanation in the space provided.

bucket B is filled with more rain water than bucket A.

**Part B**

Bucket C and Bucket D are the same size. This diagram shows the fraction of each bucket that was filled with rainwater.



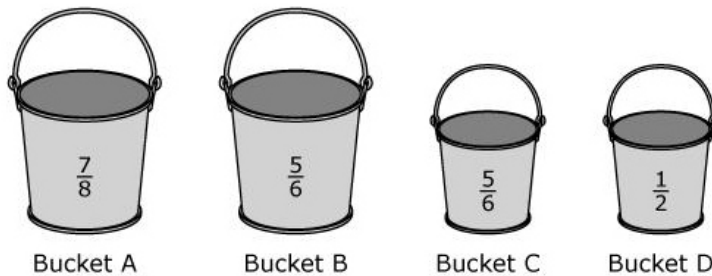
Which bucket, Bucket C or Bucket D, was filled with more rainwater? Explain how you got your answer.

Enter your answer and your explanation in the space provided.

bucket D has more rain water than bucket C

## Part C

This diagram shows all of the friends' buckets and the fraction of each bucket that was filled with rainwater.



One of the friends says that Bucket B and Bucket C were filled with the same amount of rainwater since  $\frac{5}{6}$  of each bucket was filled with rainwater.

Is the friend correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

no that friend is not correct because not all of the buckets are  $\frac{5}{6}$  of rain water only one bucket has  $\frac{5}{6}$  of rain water.

## Part D

A weatherman in another town says that his town received **less than**  $\frac{1}{2}$  inch of rainwater.

Write a fraction that represents the amount of rainwater, in inches, this town could have received. Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

The only ting thas under  $\frac{1}{2}$  is  $\frac{1}{1}$  (or 1 whole)