

2026 MCAS Sample Student Work and Scoring Guide

Grade 8 Mathematics

Question 12: Constructed-Response

Reporting Category: Statistics and Probability

Standard: [8.SP.A.4](#) - Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.

Item Description: Use relative frequencies from a two-way frequency table to solve real-world problems.

Calculator: Allowed

This item can be found in the released item sets on the [MCAS Resource Center](#).

Scoring Guide

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

Score*	Description
4A 4B	The student response demonstrates an exemplary understanding of the Statistics and Probability concepts involved in constructing and interpreting a two-way table summarizing data on two categorical variables collected from the same subjects.
3	The student response demonstrates a good understanding of the Statistics and Probability concepts involved in constructing and interpreting a two-way table summarizing data on two categorical variables collected from the same subjects. 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 Statistics and Probability concepts involved in constructing and interpreting a two-way table summarizing data on two categorical variables collected from the same subjects. 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 Statistics and Probability concepts involved in constructing and interpreting a two-way table summarizing data on two categorical variables collected from the same subjects.
0	The student response contains insufficient evidence of an understanding of the Statistics and Probability concepts involved in constructing and interpreting a two-way table summarizing data on two categorical variables collected from the same subjects. 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.

All of the employees at a small company answered the following survey questions about their weekday mornings:

- Do you exercise in the morning?
- Do you wake up before 7 a.m.?

The responses to the survey questions are shown in this table.

Responses to Survey Questions

	Exercises in the Morning	Does Not Exercise in the Morning
Wakes Up before 7 a.m.	50	20
Does Not Wake Up before 7 a.m.	35	45

Part A

Based on the table, what is the total number of employees who exercise in the morning? Show or explain how you got your answer.

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

The total number of employees that exercise in the morning is 85.

$$50 + 35 = 85$$

Part B

Based on the table, what percentage of the employees who exercise in the morning also wake up before 7 a.m.? Show or explain how you got your answer.

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

About 59% of employees who exercise in the morning also wake up before 7 a.m.

$$50 + 35 = 85$$

$$\frac{50}{85} = 0.5882353$$

Part C

Based on the table, what is the **probability** that a randomly selected employee from the company does not wake up before 7 a.m. **and** does not exercise in the morning?

- ☐ A. $\frac{15}{100}$
- ☐ B. $\frac{45}{85}$
- ☐ C. $\frac{15}{85}$
- ☒ D. $\frac{45}{100}$

Part D

The owner of the company says that employees who exercise in the morning are more likely to wake up before 7 a.m. than employees who do not exercise in the morning.

Based on the table, is the owner of the company correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

Yes, the owner is correct.

The amount of employees that exercise in the morning and wake up before 7 a.m. is about 59%. The amount of employees that do not exercise in the morning and wake up before 7 a.m. is about 31%. 59 is greater than 31, making the owner correct.

Score Point 4B

This question has four parts.

All of the employees at a small company answered the following survey questions about their weekday mornings:

- Do you exercise in the morning?
- Do you wake up before 7 a.m.?

The responses to the survey questions are shown in this table.

Responses to Survey Questions		
	Exercises in the Morning	Does Not Exercise in the Morning
Wakes Up before 7 a.m.	50	20
Does Not Wake Up before 7 a.m.	35	45

Part A

Based on the table, what is the total number of employees who exercise in the morning? Show or explain how you got your answer.

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

85 people exercise in the morning. If you add the amount of people who exercise in the morning who do and don't wake up before 7 a.m. then you get 85. $(50 + 35) = 85$

Part B

Based on the table, what percentage of the employees who exercise in the morning also wake up before 7 a.m.? Show or explain how you got your answer.

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

59% of employees who exercise in the morning also wake up before 7 a.m. To find percentage we need to find the ratio between the amount of people who wake up before 7 and exercise in the morning, 50, and the total amount of people who exercise in the morning, 85. Then we need to multiply that by 100 to find the percent. $\frac{50}{85} = .58823... \times 100 = 58.823\%$ which when rounded up becomes 59%.

Part C

Based on the table, what is the **probability** that a randomly selected employee from the company does not wake up before 7 a.m. **and** does not exercise in the morning?

- ☐ A. $\frac{45}{85}$
- ☐ B. $\frac{45}{100}$
- ☐ C. $\frac{45}{35}$
- ☒ D. $\frac{45}{130}$

Part D

The owner of the company says that employees who exercise in the morning are more likely to wake up before 7 a.m. than employees who do not exercise in the morning.

Based on the table, is the owner of the company correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

Yes, the owner is correct. We already know that the percentage of people who wake up before 7 a.m. who exercise in the morning is 59%, so to calculate for people who don't we use the same strategy. $\frac{20}{65} = .307... .307... \times 100 = 30.7\%$ when rounded = $31\% < 59\%$ which means he is correct.

Score Point 3

This question has four parts.

All of the employees at a small company answered the following survey questions about their weekday mornings:

- Do you exercise in the morning?
- Do you wake up before 7 a.m.?

The responses to the survey questions are shown in this table.

Responses to Survey Questions

	Exercises in the Morning	Does Not Exercise in the Morning
Wakes Up before 7 a.m.	50	20
Does Not Wake Up before 7 a.m.	35	45

Part A

Based on the table, what is the total number of employees who exercise in the morning? Show or explain how you got your answer.

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

The total number of employees that exercise in the morning is 85. I got this from adding up the 50 that wake up before 7AM and the 35 that wake up after 7AM.

Part B

Based on the table, what percentage of the employees who exercise in the morning also wake up before 7 a.m.? Show or explain how you got your answer.

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

$\frac{10}{17}$ or $\frac{50}{85}$ of people who exercise wake up before 7 a.m. Or about ~58.82% of people who exercise wake up before 7 a.m.

Part C

Based on the table, what is the **probability** that a randomly selected employee from the company does not wake up before 7 a.m. **and** does not exercise in the morning?

- ☐ A. $\frac{45}{85}$
- ☐ B. $\frac{45}{80}$
- ☐ C. $\frac{47}{85}$
- ☒ D. $\frac{45}{100}$

Part D

The owner of the company says that employees who exercise in the morning are more likely to wake up before 7 a.m. than employees who do not exercise in the morning.

Based on the table, is the owner of the company correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

Yes he is correct because ~58.82% of people who exercise in the morning wake up before 7 a.m.

Score Point 2

This question has four parts.

All of the employees at a small company answered the following survey questions about their weekday mornings:

- Do you exercise in the morning?
- Do you wake up before 7 a.m.?

The responses to the survey questions are shown in this table.

Responses to Survey Questions

	Exercises in the Morning	Does Not Exercise in the Morning
Wakes Up before 7 a.m.	50	20
Does Not Wake Up before 7 a.m.	35	45

Part A

Based on the table, what is the total number of employees who exercise in the morning? Show or explain how you got your answer.

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

Based on the table, 85 employees exercise in the morning, because $50 + 35 = 85$

Part B

Based on the table, what percentage of the employees who exercise in the morning also wake up before 7 a.m.? Show or explain how you got your answer.

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

Based on the table, ~58.8% percent of employees who exercise in the morning also wake up before 7 a.m., since $\frac{50}{85}$ equals about 58.8%

Part C

Based on the table, what is the **probability** that a randomly selected employee from the company does not wake up before 7 a.m. **and** does not exercise in the morning?

- ☐ A. $\frac{45}{85}$
- ☐ B. $\frac{45}{90}$
- ☒ C. $\frac{45}{95}$
- ☐ D. $\frac{45}{130}$

Part D

The owner of the company says that employees who exercise in the morning are more likely to wake up before 7 a.m. than employees who do not exercise in the morning.

Based on the table, is the owner of the company correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

Based on the table, the owner is correct, because ~71.4% of employees who wake up before 7 a.m. exercise but only 43.75% of employees who wake up after 7 a.m. exercise.

Score Point 1

This question has four parts.

All of the employees at a small company answered the following survey questions about their weekday mornings:

- Do you exercise in the morning?
- Do you wake up before 7 a.m.?

The responses to the survey questions are shown in this table.

Responses to Survey Questions

	Exercises in the Morning	Does Not Exercise in the Morning
Wakes Up before 7 a.m.	50	20
Does Not Wake Up before 7 a.m.	35	45

Part A

Based on the table, what is the total number of employees who exercise in the morning? Show or explain how you got your answer.

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

85

$$50 + 35 = 85$$

Part B

Based on the table, what percentage of the employees who exercise in the morning also wake up before 7 a.m.? Show or explain how you got your answer.

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

.33%

$$\frac{50}{150} = \frac{1}{3}$$

$\frac{1}{3}$ as a fraction is .33

Part C

Based on the table, what is the **probability** that a randomly selected employee from the company does not wake up before 7 a.m. **and** does not exercise in the morning?

- ☐ A. $\frac{45}{85}$
- ☐ B. $\frac{45}{80}$
- ☒ C. $\frac{45}{95}$
- ☐ D. $\frac{45}{150}$

Part D

The owner of the company says that employees who exercise in the morning are more likely to wake up before 7 a.m. than employees who do not exercise in the morning.

Based on the table, is the owner of the company correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

Yes, more people who do not exercises wake up after 7am

Score Point 0

This question has four parts.

All of the employees at a small company answered the following survey questions about their weekday mornings:

- Do you exercise in the morning?
- Do you wake up before 7 a.m.?

The responses to the survey questions are shown in this table.

Responses to Survey Questions		
	Exercises in the Morning	Does Not Exercise in the Morning
Wakes Up before 7 a.m.	50	20
Does Not Wake Up before 7 a.m.	35	45

Part A

Based on the table, what is the total number of employees who exercise in the morning? Show or explain how you got your answer.

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

75 people who wake up in the morning to work out

Part B

Based on the table, what percentage of the employees who exercise in the morning also wake up before 7 a.m.? Show or explain how you got your answer.

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

15 percent of people work out in the morning before 7 a.m.

Part C

Based on the table, what is the **probability** that a randomly selected employee from the company does not wake up before 7 a.m. **and** does not exercise in the morning?

- ☐ A. $\frac{45}{85}$
- ☐ B. $\frac{45}{80}$
- ☒ C. $\frac{45}{95}$
- ☐ D. $\frac{85}{130}$

Part D

The owner of the company says that employees who exercise in the morning are more likely to wake up before 7 a.m. than employees who do not exercise in the morning.

Based on the table, is the owner of the company correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

he is correct because in the graph it shows that 50 people wake up before 7 a.m. and go work out