

Math  
Released Item 2019

Algebra I

University Campus Event  
VH150250

Anchor Set  
A1–A7

With Annotations

# Prompt

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

## Part A

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

## Part B

This table shows information about the districts from which students will be invited.

**Number of Students in a District**

District Name	Number of Students in the District
<b>Allegany County</b>	9,022
<b>Anne Arundel County</b>	75,481
<b>Baltimore City</b>	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

# Rubric

## VH150250 Rubric Part A

Score	Description
<b>1</b>	<p>Student response includes the following element.</p> <ul style="list-style-type: none"><li>• <b>Modeling component</b> = 1 point<ul style="list-style-type: none"><li>○ An equation is constructed to describe the situation</li></ul></li></ul> <p>Sample Student Response:</p> <p>Let <math>D</math> represent the total number of students in a district and let <math>V</math> represent the number of visitors expected from that district. Then <b><math>V = 1/13 \times 0.10 \times D</math></b>.</p> <p>Note: An alternate acceptable equation is <b><math>V = 0.10 \times D</math></b> where <math>D</math> represents the students invited (10th grade). Or other valid response.</p>
<b>0</b>	Student response is incorrect or irrelevant.

# Rubric

## VH150250 Rubric Part B

Score	Description
<b>2</b>	<p>Student response includes the following 2 elements.</p> <ul style="list-style-type: none"><li>• <b>Computation component</b> = 1 point<ul style="list-style-type: none"><li>○ Valid estimate and work based on the constructed equation</li></ul></li></ul> <p>Sample Student Response:</p> <p>The total number of students from the chart is 168,303. If I evaluate my equation for <b><math>D = 168,303</math></b>, I get a value of 1294.64.</p> <p><b><math>V = (9,022 + 75,481 + 83,800)/13 \times 0.10</math></b>, which is about 1,295 visitors.</p> <ul style="list-style-type: none"><li>• <b>Reasoning component</b> = 1 point<ul style="list-style-type: none"><li>○ The assumptions used when writing the equation are explained</li></ul></li></ul> <p>Sample Student Response:</p> <p>Since the given value is the total number of students in a district and the visitors are tenth-grade students, the total number of students should be divided by the number of grades, which is 13. This assumes that there are an equal number of students in each grade.</p> <p>Or other valid response.</p>
<b>1</b>	Student response includes 1 of the 2 elements.
<b>0</b>	Student response is incorrect or irrelevant.

## Part A: Score Point 1

## Part B: Score Point 2

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

**Part A**

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$y = .1x$$

If  $y$  is representing the number of students who attend, and  $x$  is the number of 10th grade students invited, then it would be 10%, or .1 times  $x$  in order to see how many students would attend.

**Part B**

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegheny County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

Assuming that the number of students in each grade is equal.  
 Allegheny 694 students  
 Anne Arundel 5806 students  
 Baltimore 6446 students

$$694 + 5806 + 6446 = 12946$$

$$\frac{12946}{10} = 1294.6$$

$y \approx 1295$  students will visit the university.

## Annotation

### **Anchor Paper 1**

This response receives full credit. It includes each of the three required elements.

#### **Part A: Score Point 1**

- The response includes a properly constructed equation with correctly defined variables ( $y = .1x$ , If  $y$  is representing the number of students who attend, and  $x$  is the number of 10<sup>th</sup> grade students invited).

#### **Part B: Score Point 2**

- The response includes a correct assumption used when making the equation (Assuming that the number of students in each grade is equal).
- The response includes a valid estimate and operations based on the equation given ( $694 + 5806 + 6446 = 12946$ ,  $12946/10 = 1294.6$ ,  $y \approx 1295$  students will visit the university).

The response indicates the assumption of an equal number of students in each grade.

## Part A: Score Point 1

## Part B: Score Point 1

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

**Part A**

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$a = t \times 10\%$$

$$a = \textit{attendance}$$

$$t = \textit{number of tenth graders}$$

**Part B**

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegheny County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

$$9022 + 17481 + 83800 = 110303$$

$$t = 110303 \div 13$$

$$t = 8485$$

$$a = 8485 \times 10\%$$

$$a = 849$$

there will be 849 tenth graders at the event

## Annotation

### **Anchor Paper 2**

This response receives partial credit. It includes two of the three required elements.

#### **Part A: Score Point 1**

- The response includes a properly constructed equation with correctly defined variables ( $a = t \times 10\%$ ,  $a = \text{attendance}$ ,  $t = \text{number of tenth graders}$ ).

#### **Part B: Score Point 1**

- The response includes a correct assumption used when making the equation ( $t = 110303 \div 13$ ).

The response use an incorrect number to calculate the total number of students in all three districts (17481 is used instead of 75481). Therefore, no credit is earned for element three (valid operations), but the assumption of dividing the total number of students by 13 is correct and does receive credit for element two.

Part A: Score Point 1  
Part B: Score Point 0

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

**Part A**

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$\frac{1}{10} x = t$$

$t = total$  amount of students expected to come

$x = total$  amount of tenth graders in all three districts

I'm assuming that, since all tenth graders are invited and they expect ten percent to come, that one tenth of the tenth graders will attend.

**Part B**

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegany County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

$$9022 + 75481 + 83800$$

$$168303$$

$$168303 \div 10 = 16830.3$$

$$16830.0 \approx 16830$$

About 16830 students are expected to attend.

## Annotation

### **Anchor Paper 3**

This response receives partial credit. It includes one of the three required elements.

#### **Part A: Score Point 1**

- The response includes a properly constructed equation with correctly defined variables ( $\frac{1}{10}x=t$ ,  $t$ = total amount of students expected to come,  $x$ =total amount of tenth graders in all three districts).

#### **Part B: Score Point 0**

The response states an assumption that is given in the prompt and, therefore, does not receive credit for element two (I'm assuming that, since all tenth graders are invited and they expect ten percent to come, that one tenth of the tenth graders will attend). The response makes an incorrect estimate for the number of tenth graders expected to attend, earning no credit for element three.

**Note:** No credit can be earned for element three for finding ten percent of the total student population and using that as an answer for ten percent of the tenth grade students.

## Part A: Score Point 0

## Part B: Score Point 1

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

**Part A**

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$\frac{\left(\frac{x}{12}\right)}{90} = y$$

Since the schools have every grade, you would have to divide the total amount of students to the twelve grades, then you have the average amount of 10th graders. Then you divide that number by 90% because only 10% of 10th grade students are expected to attend. And that's how you get your final answer.

**Part B**

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegheny County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

$$\frac{9,022}{12} = 751.83 \approx 752$$

$$\frac{75481}{12} = 6290.083 \approx 6291$$

$$\frac{83800}{12} = 698.333 \approx 699$$

$$752 + 6291 + 699 = 7742$$

$$\frac{7742}{90} = 86.0222 \approx 87$$

Approximately 87 students will be expected to visit the university.

## Annotation

### **Anchor Paper 4**

This response receives partial credit. It includes one of the three required elements.

#### **Part A: Score Point 0**

- The response does not provide a correct equation; therefore, no credit is earned for element one.

#### **Part B: Score Point 1**

- The response includes a correct assumption used when making the equation (Since the schools have every grade, you have to divide the total amount of students to the twelve grades, then you have the average amount of 10th graders).

The response contains a mathematical error:  $83800/12$  does not equal 698.333, it equals 6983.33. Therefore, no credit is earned for element two.

A5

Part A: Score Point 0

Part B: Score Point 1

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

**Part A**

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

Tenth graders in school equal T.  
divide T by .10 to estimate number of tenth graders attending college thing.  
A equals attending

$$T \div .10 = A$$

**Part B**

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegheny County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

For All countys you can assume that about  $\frac{1}{12}$  of the county is tenth graders. Take that number and multiply it by 0.10

$$\text{Allegheny county} = 75$$

$$\text{AA count } y = 629$$

$$\text{Bc count } y = 698$$

## Annotation

### **Anchor Paper 5**

This response receives partial credit. It includes one of the three required elements.

### **Part A: Score Point 0**

The response does not provide a correct equation; therefore, no credit is earned for element one. The response indicates to divide the number of tenth grade students by 0.10 when the correct equation would multiply the number of tenth grade students by 0.10.

### **Part B: Score Point 1**

- The response includes a correct assumption used when making the equation (For All counties you can assume that about 1/12 of the county is tenth graders).

The response gives an incomplete estimate for the number of tenth graders attending by not totaling the three districts estimates together. Therefore, no credit is earned for element two.

## Part A: Score Point 0

## Part B: Score Point 0

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

**Part A**

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$0.10 \times 30 = .3$$

This equation shows that 30 tenth graders should be attending the university campus.

**Part B**

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegany County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

$$0.10 \times 9022 = 902$$

$$0.10 \times 75481 = 7,548$$

$$0.10 \times 83800 = 8,380$$

$$902 + 7,548 + 8,380 = 16,830$$

From all of my work, 16,830 tenth graders will be expected to visit the university.

## Annotation

### **Anchor Paper 6**

This response receives no credit. It includes none of the three required elements.

### **Part A: Score Point 0**

The response does not provide a correct equation; therefore, no credit is earned for element one.

### **Part B: Score Point 0**

The response does not provide a correct assumption; therefore, no credit is earned for element three. The response makes an incorrect estimate for the number of tenth graders expected to attend, earning no credit for element two.

**Note:** No credit can be earned for element three for finding ten percent of the total student population and using that as an answer for ten percent of the tenth grade students.

A7

Part A: Score Point 0

Part B: Score Point 0

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

**Part A**

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$\frac{10\%}{10} \times \text{number of kids in district}$$

**Part B**

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegany County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

10% of the kids will show from each school district

## Annotation

### **Anchor Paper 7**

This response receives no credit. It includes none of the three required elements.

### **Part A: Score Point 0**

The response does not provide a correct equation; therefore, no credit is earned for element one.

### **Part B: Score Point 0**

The response does not provide a correct assumption; therefore, no credit is earned for element three. The response does not provide a correct estimate for the number of tenth graders expected to attend, earning no credit for element two.

# Practice Set

P1–P8

No Annotations Included

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

**Part A**

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$n = 3d + .10$$

**Part B**

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegany County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

1295 students should attend because if you divide by 13 for all tenth graders and then divide that by 10 for 10% of all tenth graders you get 1295.

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

### Part A

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$\frac{x}{10} \times 3$$

### Part B

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegany County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

16830

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

### Part A

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$y = 0.10x$$

0.10 is the 10% then multiplied by the number of 10th grade students at the school,  $x$ , and the  $y$  would be how many students will attend.

### Part B

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegany County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

16,830 students will be expected to visit the university. Allegany:  
 $0.10 \times 9022 = 902$   
 Anne:  $0.10 \times 75481 = 7548$   
 Baltimore:  $0.10 \times 83800 = 8380$   
 $902 + 7548 + 8380 = 16,830$   
 students

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

### Part A

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$\begin{aligned}
 s &= \textit{students} \\
 a &= \textit{allegany county} \\
 b &= \textit{anne arundel county} \\
 c &= \textit{baltimore city} \\
 \\ 
 s &= [(a + b + c) \div 13]0.1
 \end{aligned}$$

First we would add up the number of students from each district. Then we would divide by 13 grades to find the average amount of students per grade. We can assume that this is also the number of tenth graders. We would then multiply by 0.1 to find 10% of the total number of eighth graders. The solution to this equation will be an estimate of the amount of tenth grade students attending.

### Part B

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegany County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

$$\begin{aligned}
 s &= \textit{students} \\
 s &= 9,022 + 75,481 + 83,800 / 13 \\
 s &= 12946 \\
 s &= 12946 \cdot 0.1 \\
 s &= 1294.6 \\
 \text{The university expects about 1,295} \\
 \text{students to attend.}
 \end{aligned}$$

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

**Part A**

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$9,022 + 75,481 + 83,800$$

**Part B**

This table shows information about the districts from which students will be invited.

**Number of Students in a District**

District Name	Number of Students in the District
Allegany County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

$$1,68303$$

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

### Part A

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

The equations for the total amount of tenth graders to show up is  $y = .10x$  because if there is only an expected amount of ten percent, then you need to take  $x$ , being the amount of invitations, multiplied by the expected amount to equal  $y$ , the amount of tenth grade students at the dance.

### Part B

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegany County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

I took the number of students in each school district and divided by 12 because there are 12 grade level being served, so that is how I got the estimate of tenth graders. Then I added them all together to get 13,824. I then proceeded to multiply by .10 to get 1382.4 which is the expected amount to visit the university.

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

### Part A

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$n = \text{number of students invited}$   
 $s = \text{number of students that attend the event}$

$$s = n / 10$$

### Part B

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegany County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

$$9,022 + 75,481 + 83,800 = 168,303$$

$$168,303 / 10 \sim 16830$$

About 16830 students are expected to visit the university.

A university organizes an event in which all tenth-grade students from three school districts are invited to visit the university campus. Each school district serves students from kindergarten through twelfth grade. The organizers expect 10% of the invited students to attend.

### Part A

Write an equation that can be used to predict the total number of tenth-grade students expected to attend. Describe the assumptions you used to determine your equation.

Enter your equation and your work in the space provided.

$$y = 0.10x$$

$x = \textit{invited}$  tenth graders  
 $y = \textit{attending}$  tenth graders

### Part B

This table shows information about the districts from which students will be invited.

Number of Students in a District

District Name	Number of Students in the District
Allegheny County	9,022
Anne Arundel County	75,481
Baltimore City	83,800

Estimate the total number of tenth-grade students expected to visit the university.

Enter your answer and your work in the space provided.

$$\frac{9022}{12} = 751$$

$$\frac{75481}{12} = 6290$$

$$\frac{83800}{12} = 6983$$

$$751 + 6983 + 6290 = 14024$$

$$\frac{14024}{10} \approx 1402 \text{ estimated attending 10th graders}$$

# Practice Set

<b>Paper</b>	<b>Score</b>
<b>P1</b>	<b>0,1</b>
<b>P2</b>	<b>0,0</b>
<b>P3</b>	<b>1,0</b>
<b>P4</b>	<b>1,2</b>
<b>P5</b>	<b>0,0</b>
<b>P6</b>	<b>1,1</b>
<b>P7</b>	<b>1,0</b>
<b>P8</b>	<b>1,2</b>