

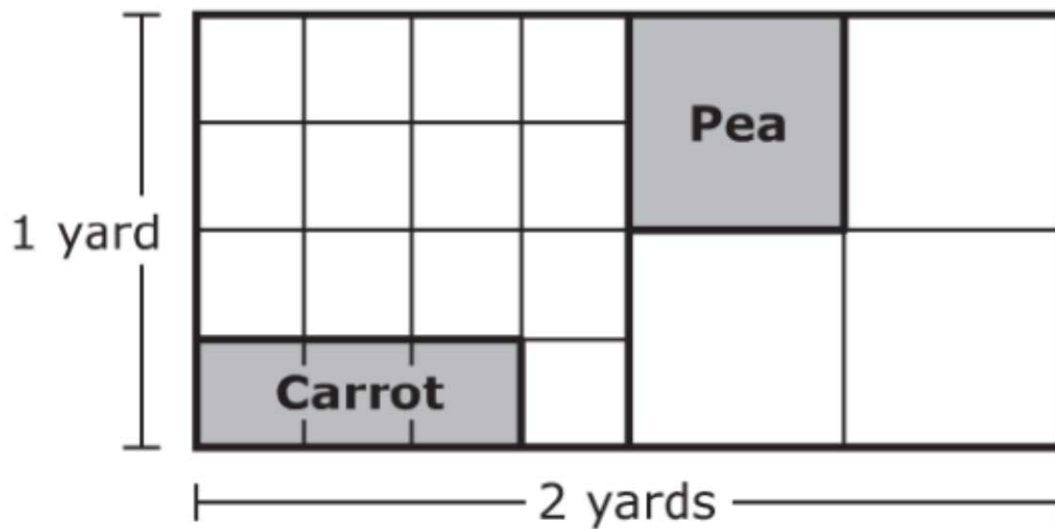


Math
Spring Operational 2015

Grade 5
PBA Item #15
How Much Larger Pea Section
VF822728

Prompt

Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

Enter your equation and your solution in the space provided.

Rubric

Task is worth a total of 3 points.

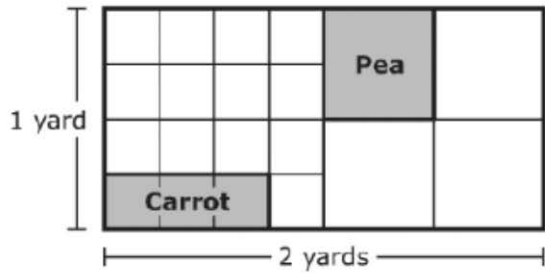
VF822728 Rubric

Score	Description
3	<p>Student response includes the following 3 elements.</p> <ul style="list-style-type: none">• Modeling component = 2 points<ul style="list-style-type: none">○ Correct explanation of how to use the model to find the size of each section of the garden.○ Correct use of common denominators to write an equation to find the difference between the two sections of the garden.• Computation component = 1 point<ul style="list-style-type: none">○ The student finds how many square yards larger the pea section is than the carrot section. <p>Sample Student Response:</p> <p>Since there are 16 squares in the first half of the model and 3 are shaded, this means that the area of the carrot section is $\frac{3}{16}$ square yard. Since there are 4 squares in the second half of the model and 1 is shaded, this means that the area of the pea section is $\frac{1}{4}$ square yard.</p> $\frac{4}{16} - \frac{3}{16} = \frac{1}{16}$ <p>$\frac{1}{16}$ square yard</p> <p>Notes:</p> <ul style="list-style-type: none">○ A variety of explanations are possible. As long as the explanation shows a clear understanding of using the model to find the size of each section, credit should be awarded.○ A variety of equations are possible. As long as the equation can be used to represent the problem, credit should be awarded.○ If a student uses the model for peas and divides it into sixteenths in order to use the common denominator, the student should be awarded both modeling points since the modeling for two steps was completed in one step.
2	Student response includes 2 of the 3 elements.
1	Student response includes 1 of the 3 elements.
0	Student response is incorrect or irrelevant.

Anchor Set

A1 – A8

Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

$$C = \frac{3}{16}$$

$$P = \frac{1}{4}$$

$$\frac{1}{4} \square \times \frac{4}{4} \square = \frac{4}{16}$$

$$\frac{4}{16} - \frac{3}{16} \square = \frac{1}{16} \text{ larger.}$$

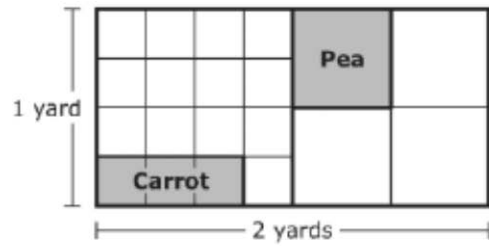
Annotations

Anchor Paper 1 Score Point 3

This response receives full credit. The student includes each of the three required elements:

- The response shows the model was used to find the size of each section of the garden ($C = \frac{3}{16}$, $P = \frac{1}{4}$).
- The response shows the use of common denominators to write an equation to find the difference between the two sections of the garden ($\frac{4}{16} - \frac{3}{16} = \frac{1}{16}$).
- The response indicates that the pea section is $\frac{1}{16}$ square yard larger than the carrot section.

Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

$$\frac{4}{16} - \square \frac{3}{16} \square = \frac{1}{16}$$

Annotations

Anchor Paper 2

Score Point 3

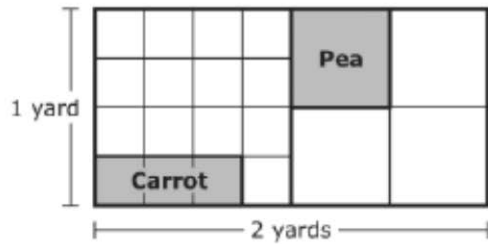
This response receives full credit. The student includes each of the three required elements:

- The response shows the model was used to find the size of each section of the garden $(\frac{4}{16}, \frac{3}{16})$.
- The response shows the use of common denominators to write an equation to find the difference between the two sections of the garden $(\frac{4}{16} - \frac{3}{16} = \frac{1}{16})$.
- The response indicates that the pea section is $\frac{1}{16}$ square yard larger than the carrot section.

The response for the first element converts $\frac{1}{4}$ to $\frac{4}{16}$, which is acceptable. The response is not labeled, but the correct fractions identify the sections.

Note: If a student uses the model for peas and divides it into sixteenths in order to use the common denominator, the student should be awarded 2 points since the modeling for two steps was completed in one step.

Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

The pea area would be bigger because it is $\frac{1}{4}$ and the carrot is $\frac{3}{16}$.
The answer would be $\frac{1}{16}$ bigger.

Annotations

Anchor Paper 3

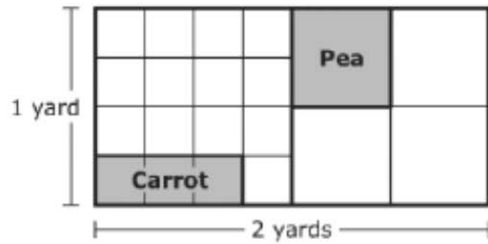
Score Point 2

This response receives partial credit. The student includes two of the three required elements:

- The response shows the model was used to find the size of each section of the garden (*The pea area would be bigger because it is $\frac{1}{4}$, carrot is $\frac{3}{16}$ $\frac{3}{16}$*).
- The response indicates that the pea section is $\frac{1}{16}$ square yard larger than the carrot section.

The response does not show the use of common denominators to write an equation to find the difference between the two sections of the garden, so that element receives no credit.

Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

$$\text{carrot } a = \frac{3}{16} \text{ yard}$$

$$\text{Pea } a = \frac{1}{4} \text{ yard}$$

$$\frac{1}{4} - \frac{3}{16} \square = \frac{1}{16}$$

The pea section is $\frac{1}{16}$ yard larger than the carrot section.

Annotations

Anchor Paper 4

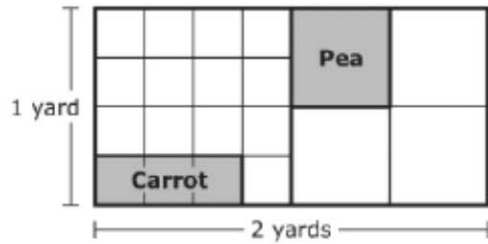
Score Point 2

This response receives partial credit. The student includes two of the three required elements:

- The response shows the model was used to find the size of each section of the garden (*carrot* $a = \frac{3}{16}$ yard, *Pea* $a = \frac{1}{4}$ yard).
- The response indicates that the pea section is $\frac{1}{16}$ square yard larger than the carrot section.

Although the response provides an equation ($\frac{4}{16} - \frac{3}{16} = \frac{1}{16}$), the fractions are not converted to a common denominator; therefore, it is unclear how the answer is obtained, so this element receives no credit.

Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

$$\frac{1}{4} \square = \frac{4}{16} \quad \frac{3}{16} \square = \frac{3}{16}$$
$$\frac{3}{16} < \frac{4}{16} \text{ the carrot takes up } \frac{3}{16}$$

Annotations

Anchor Paper 5

Score Point 1

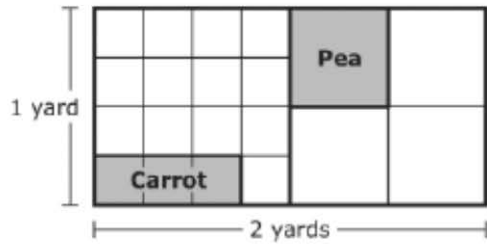
This response receives partial credit. The student includes one of the three required elements:

- The response shows the model was used to find the size of each section of the garden $(\frac{1}{4}, \frac{3}{16})$.

Although the response shows work for making the fractions have a common denominator $(\frac{1}{4} = \frac{4}{16}, \frac{3}{16} = \frac{3}{16})$, there is no attempt to write and solve an equation.

There is no attempt to provide the difference in size of the two vegetable sections.

Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

equation . $\frac{1}{4} > \frac{3}{16}$

Annotations

Anchor Paper 6

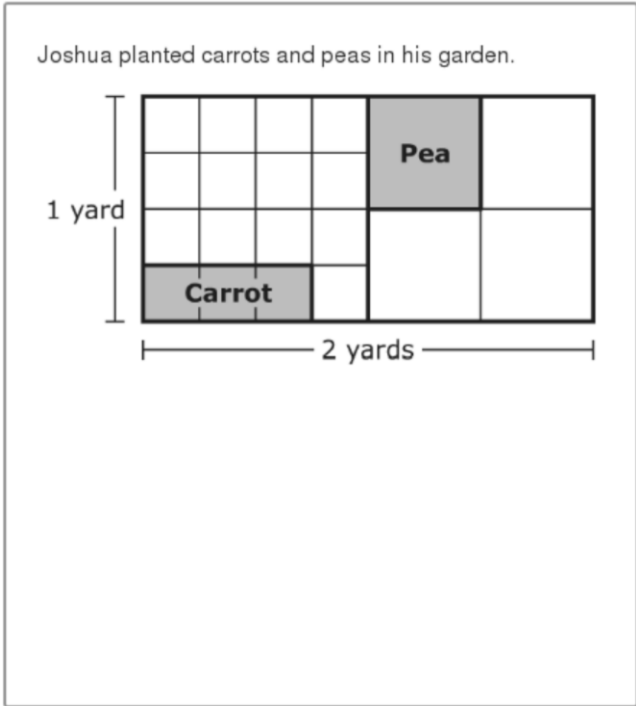
Score Point 1

This response receives partial credit. The student includes one of the three required elements:

- The response shows the model was used to find the size of each section of the garden $(\frac{1}{4}, \frac{3}{16})$.

The response shows no attempt to write and solve an equation.

There is no attempt to provide the difference in size of the two vegetable sections.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

Calculator interface showing basic arithmetic symbols: $\frac{\square}{\square}$, $\frac{\square}{\square}$, $\frac{\square}{\square}$, \times , $+$, $-$, \div , $\frac{\square}{\square}$, $\frac{\square}{\square}$, $=$, $<$, $>$, $(.)$, $?$

the pea garden is 4 square feet long and the carrot is 3 feet long so the pea is bigger by 1 square feet.
 $4 - 1 = 3$

Calculator interface showing a numeric keypad and arithmetic symbols:

- Numbers: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, , .
- Arithmetic and Units: \neq , [.]\$, $^{\circ}$

Annotations

Anchor Paper 7

Score Point 0

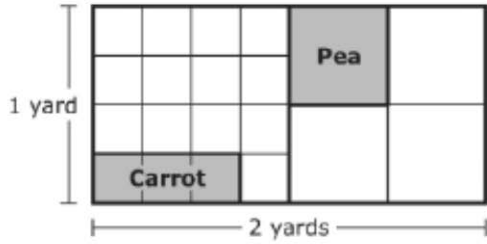
This response receives no credit. The student includes none of the three required elements.

The response makes an attempt to show the model was used to find the size of each section of the garden (*the pea garden is 4 square feet long and the carrot is 3 feet long*), but it is incorrect.

The response makes an attempt to write an equation to find the difference between the two sections of the garden ($4 - 1 = 3$), but it is incorrect.

The response indicates that the pea garden is larger by 1 square foot, which is incorrect.

Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

They are both equal because 4 small squares of the *carrots* = 1 big square of the peas.

Annotations

Anchor Paper 8

Score Point 0

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

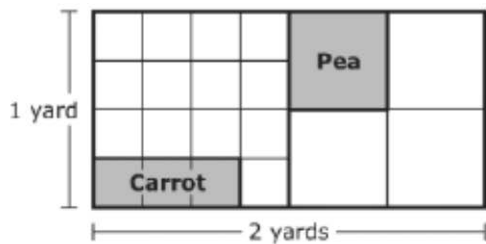
The response makes an attempt to show the model was used to find the size of each section of the garden (*4 small squares of the carrots = 1 big square of the peas*), but it is incorrect.

The response shows no attempt to write and solve an equation.

There is no attempt to provide the difference in size of the two vegetable sections.

Practice Set
P101 - P105

Joshua planted carrots and peas in his garden.



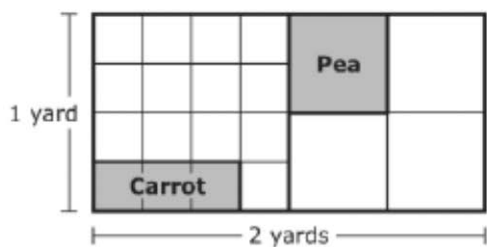
Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

Peas: $(1 \times 1) \div 4 = \frac{1}{4}$ yds which equals $\frac{4}{16}$ yds.

Carrots: $(1 \times 1) \div 16 \times 3 = \frac{3}{16}$.

The peas are $\frac{1}{16}$ yds larger than the carrots.

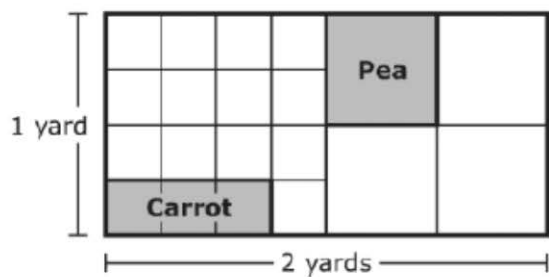
Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

The pea section is $\frac{1}{16}$ bigger.

Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

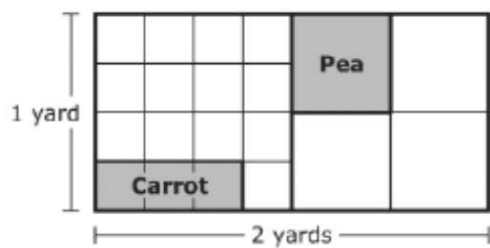
$$\text{peas} = \frac{1}{4}$$

$$\text{carrots} = \frac{3}{16}$$

□

$$\frac{1 \times 4}{4 \times 4} - \frac{3}{16} = \frac{1}{16} \text{ more peas than carrots.}$$

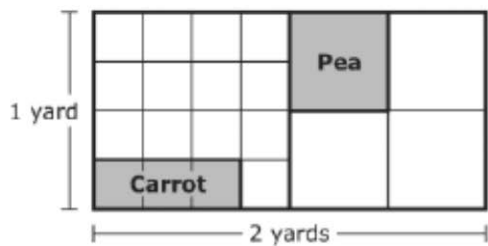
Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

$$\frac{1}{4} - \frac{3}{16} = \frac{1}{16}$$

Joshua planted carrots and peas in his garden.



Use the model to write and solve an equation that shows how much larger the pea section of the garden is than the carrot section of the garden.

pea:area is 4
Carrot:area is 16
So the carrot has a bigger garden than the pea garden.

Practice Set

Paper	Score
P101	2
P102	1
P103	3
P104	2
P105	0