

Math
Spring Operational 2015

Grade 3
PBA Item #14
Total Number of Buttons
0435-M01415

Note:

Many student responses to this item showed reasoning that is more procedural in nature than is called for in the standards. Students were given credit for this type of explanation as it met the prompt requirement for this item and most likely reflects the instruction they received. This does not mean future instruction should focus on algorithms at the expense of the underlying place value understanding expected by the standards. A proper understanding of the place value system is crucial for continual development as students progress toward college and career readiness.

Prompt

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because

$0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then
 $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

Rubric

Task is worth a total of 4 points.

0435-M01415 Rubric Part A	
Score	Description
2	<p>Student response includes the following 2 elements.</p> <ul style="list-style-type: none">• Reasoning component = 1 point<ul style="list-style-type: none">○ Valid explanation of why Jeanie's reasoning was incorrect using the ones place and tens place• Computation component = 1 point<ul style="list-style-type: none">○ Correct total number of buttons, 98 <p>Sample Student Response: Jeanie's reasoning is incorrect because she didn't realize that 18 means 1 ten and 8 ones. So she didn't add the 10 when she added the other tens. She put the 8 tens in the hundreds place. The total number of buttons she has is 98 because</p> $\begin{array}{r} 120 \\ 19 \\ 31 \\ + 28 \\ \hline 98. \end{array}$ <p>Or equivalent explanation.</p>
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

0435-M01415 Rubric Part B

Score	Description
2	<p>Student response includes the following 2 elements.</p> <ul style="list-style-type: none">• Reasoning component = 1 point<ul style="list-style-type: none">○ Correct explanation of why Jeanie's reasoning for subtraction was incorrect• Computation component = 1 point<ul style="list-style-type: none">○ Correct number of buttons, 12 <p>Sample Student Response: Jeanie's reasoning is incorrect because she subtracted the smaller number from the larger number in each place and did not consider the numbers 31 and 19 as two-digit numbers. She has 12 more red buttons than orange buttons.</p> $\begin{array}{r} 23^11 \\ - 19 \\ \hline 12 \end{array}$ <p>Or equivalent explanation.</p>
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

Anchor Set

A1 – A10

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

$20 + 19 + 31 + 28 = 98$ I think he is wrong because he didn't carry the 1 in the 18.

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

$31 - 19 = 12$ I think she was wrong because you should cross out the 1, make it a 11 and cross out the 3, make it a 2.

Annotations

Anchor Paper 1

Part A Score Point 2

This response receives full credit. The response includes each of the two required elements.

- There is an explanation of why Jeanie's reasoning is incorrect, referencing place value (*because he didnt cary the 1 in the 18*).
- The student finds the correct total number of buttons (*98*).

Part B Score Point 2

This response receives full credit. The response includes each of the two required elements.

- Referencing decomposing a ten is a sufficient explanation of why Jeanie's reasoning for subtraction is incorrect (*because your suposto cross out the 1 make it a 11 and cross out the 3 make it a 2*).
- The student finds the correct number of buttons (*12*).

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

its wrong because she added right but got mixed up with her ones you are only supposed to leave the 8 in the ones place you have to take the 1 and put it with the tens there for the answer is 98

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

its wrong because you are not supposed to switch them around you are supposed to borrow a ten from the number to the left so the answer is 12

Annotations

Anchor Paper 2

Part A Score Point 2

This response receives full credit. The response includes each of the two required elements.

- There is an explanation of why Jeanie's reasoning is incorrect, referencing place value (*got mixed up with her ones . . . have to take the 1 and put it with the tens there*).
- The student finds the correct total number of buttons (98).

Part B Score Point 2

This response receives full credit. The response includes each of the two required elements.

- Referencing decomposing a ten is a sufficient explanation of why Jeanie's reasoning for subtraction is incorrect (*because you are not supposed to switch them around you are supposed to borrow a ten from the number to the left*).
- The student finds the correct number of buttons (12).

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

The correct answer is 98 because $0 + 9 + 8 + 1 = 18$ and then add $2 + 1 + 3 + 2 + 1 = 9$ so the right answer is 98.

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

The correct answer is 12 because 1 is not bigger than 9 so carry the one and you have $11 - 9 = 2$ then $2 - 1 = 1$ so that gives you 12.

Annotations

Anchor Paper 3 Part A Score Point 1

This response receives partial credit. The response includes one of the two required elements.

- The student finds the correct total number of buttons (98).

While work is shown to find the correct total number of buttons, this does not address place value, which is the basis of why Jeanie's reasoning is incorrect.

Part B Score Point 2

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

- There is an explanation of why Jeanie's reasoning for subtraction is incorrect (*because 1 is not bigger than 9 so carry the one*). The student implies decomposing a ten despite imprecise language, so this response is sufficient for credit.
- The student finds the correct number of buttons (12).

Note: The response indicates composing a ten (carry the one) rather than decomposing a ten in the explanation, which is imprecise mathematical language for subtraction. However, a score point would only be deducted for imprecise language from responses that would otherwise receive a top score point of 2/2. Since the top score point is not possible, the response receives a score of 1/2.

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

She put 18 in the ones place and you can not put two numbers in one place. She also didn't add the correct numbers. The answer is 98.

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

She has 12 more. She got the answer wrong because you do not subtract smaller numbers from bigger numbers.

Annotations

Anchor Paper 4 Part A Score Point 2

This response receives full credit. The response includes each of the two required elements.

- There is an explanation of why Jeanie's reasoning is incorrect, using the ones and tens place (*She put 18 in the ones place and you can not put two numbers in one place*).
- The student finds the correct total number of buttons (*98*).

Part B Score Point 1

This response receives partial credit. The response includes one of the two required elements.

- The student finds the correct number of buttons (*12 more*).

The explanation of why Jeanie's reasoning is incorrect is unclear (*because you do not subtract smaller numbers from bigger numbers*). The explanation needs to show a more specific understanding of whole numbers as related to decomposing a ten and place value when a larger digit is subtracted from a smaller digit.

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

she has to take the ten over to the tens place and go on with the question.

$$20 + 19 + 31 + 28 = 98$$

98

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

$$28 + 3 = 31$$

She has to count up to the number by ones then what she got is the answer

Annotations

Anchor Paper 5

Part A Score Point 2

This response receives full credit. The response includes each of the two required elements.

- There is an explanation of why Jeanie's reasoning is incorrect, referencing place value (*she has to take the ten over to the tens place*).
- The student finds the correct total number of buttons (98).

Part B Score Point 0

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

An explanation is provided that involves counting rather than subtracting (*She has to count up to the number by ones then what she got is the answer*), but the explanation does not address why Jeanie's reasoning is incorrect.

The response shows an incorrect difference in the number of buttons (*31 . . . then what she got is the answer*). The work shown is one step in a method for finding the difference between yellow and red buttons rather than orange and red buttons. ($28 + 3 = 31$).

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

$$20 + 19 + 31 + 28 = 98$$

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

$$31 - 19 = 12$$

Annotations

Anchor Paper 6 **Part A Score Point 1**

This response receives partial credit. The response includes one of the two required elements.

- The student finds the correct total number of buttons (98).

The response provides no explanation addressing why Jeanie's reasoning is incorrect.

Part B Score Point 1

This response receives partial credit. The response includes one of the two required elements.

- The student finds the correct number of buttons (12).

The response provides no explanation addressing why Jeanie's reasoning is incorrect.

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

$$20 + 19 + 31 + 28 = 98$$

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

32

Annotations

Anchor Paper 7

Part A Score Point 1

This response receives partial credit. The response includes one of the two required elements.

- The student finds the correct total number of buttons (98).

The response provides no explanation of why Jeanie's reasoning is incorrect.

Part B Score Point 0

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

The response provides no explanation of why Jeanie's reasoning is incorrect, and the number of buttons (32) is incorrect.

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

$$20 + 19 + 31 + 28 = 78$$

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

$$31 - 19 = 12$$

Annotations

Anchor Paper 8

Part A Score Point 0

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

The response provides no explanation of why Jeanie's reasoning is incorrect, and the number of buttons (78) is incorrect.

Part B Score Point 1

This response receives partial credit. The response includes one of the two required elements.

- The student finds the correct number of buttons (12).

The response provides no explanation of why Jeanie's reasoning is incorrect.

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

$20 + 19 + 31 + 28 = 97$ it reasoning because you just add the whole number

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

$31 - 19 = 31$ she is not reasonable because she add the second numbers

Annotations

Anchor Paper 9

Part A Score Point 0

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

The response provides an insufficient explanation of why Jeanie's reasoning is incorrect (*because you just add the whole number*) and an incorrect total number of buttons (97).

Part B Score Point 0

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

The response provides an incorrect explanation of why Jeanie's reasoning is incorrect (*because she add the second numbers*) and an incorrect number of buttons (31).

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

52

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

24

Annotations

Anchor Paper 10

Part A Score Point 0

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

The response provides no explanation of why Jeanie's reasoning is incorrect and an incorrect total number of buttons (52).

Part B Score Point 0

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

The response provides no explanation of why Jeanie's reasoning is incorrect and an incorrect number of buttons (24).

Practice Set P101 - P105

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

because she added it rong the real answer is 808.

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

she has 12 more red buttons then orange

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

she is incorrect because she was ment to carry the 1 in 18. the correct answer is 98 buttins.

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

she forgot that the bigger number can go on top .she just has to borrow from another number to make the small number bigger.she has 12 more buttons.

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

jeanie's reasoning is incorrect because she has to add them all together in one math problem so she could do $20 + 19 + 31 + 29 = 99$ so 99 would be the number of buttons she has altogether.

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

jeanie is incorrect because she has to subtract in one number sentence and she has to regroup she has to do $31 - 19$ and she can't subtract 9 from 1 she has to regroup and make the 3 into a 2 and make the 1 into a 11 so you do $11 - 9 = 2$ and then you subtract $2 - 1$ and get and tou get 1 so there are 12 more red buttons than orange buttons

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

$$90 + 80 = 170$$

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

67

Jeanie has different colored buttons as shown. She wants to determine the total number of buttons she has altogether.

- 20 blue
- 19 orange
- 31 red
- 28 yellow

Part A

Jeanie explains there are a total of 818 buttons because $0 + 9 + 1 + 8 = 18$ in the ones place, so she writes down 18. Then $2 + 1 + 3 + 2 = 8$ in the tens place, so she writes down 8 in front of the 18.

Explain why Jeanie's reasoning is incorrect. Find the total number of buttons she has altogether.

She is wrong because she didn't regroup her answer she would have to carry the one to the tens place and then she would add that with the tens place.

Part B

Jeanie explains there are 28 more red buttons than orange buttons because the smaller number is always subtracted from the larger number. So she got $9 - 1 = 8$ in the ones place and $3 - 1 = 2$ in the tens place.

Explain why Jeanie's reasoning is incorrect. Find how many more red buttons than orange buttons she has.

Her answer is wrong because you would have to borrow a ten from the tens place so that the one in 31 would turn into 11.

Practice Set

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