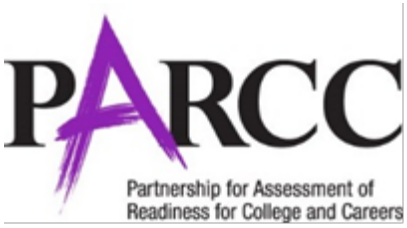

Math
Released Item 2016

Grade 7

Two Expressions Shown
1591-M22550

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

$$\text{Expression 1: } 4(4.1x + 10.7y)$$

$$\text{Expression 2: } 2(6.1x + 25.3y + 2.1x - 3.9y)$$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

Enter your work and explanation in the space provided.

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for *x* and *y* to support your answer.

Enter your answer and explanations in the space provided.

<table>
<tr><th colspan="2">Rubric Part A</th></tr>
<tr><th>Score</th><th>Description</th></tr>
<tr><td>2</td><td>Student response includes the following 2 elements.
• Reasoning component = 1 point
o The student provides an explanation and work showing that expression 1 is equivalent to the expression the teacher wrote.
• Reasoning component = 1 point
o The student provides an explanation and work showing that expression 2 is equivalent to the expression the teacher wrote.

Sample Student Response:
Both expressions could be equivalent to the expression written on the board, since it is possible to have more than one equivalent expression.
If I start with the teacher's expression and distribute, combine like terms, and then factor I can rewrite it so that it is the same as expression 1. This means that the student's claim that expression 1 is equivalent to the teacher's expression is correct.
$12.2x + 50.6y + 3(1.4x - 2.6y)$
$= 12.2x + 50.6y + 4.2x - 7.8y$
$= 16.4x + 42.8y$
$= 4(4.1x) + 4(10.7y)$
$= 4(4.1x + 10.7y)$
If I start with the teacher's expression and distribute, combine like terms, and then factor I can rewrite it so that it is the same as expression 2. This means that the student's claim that expression 2 is equivalent to the teacher's expression is correct.
$12.2x + 50.6y + 3(1.4x - 2.6y)$
$= 12.2x + 50.6y + 4.2x - 7.8y$
$= 2(6.1x) + 2(25.3y) + 2(2.1x) - 2(3.9y)$
$= 2(6.1x + 25.3y + 2.1x - 3.9y)$</td></tr>
<tr><td>1</td><td>Student response includes 1 of the above elements.</td></tr>
<tr><td>0</td><td>Student response is incorrect or irrelevant.</td></tr>
<tr><th colspan="2">Rubric Part B</th></tr>
<tr><th>Score</th><th>Description</th></tr>
</table>

2	Student response includes the following 2 elements. • **Reasoning component** = 1 point o The student provides an explanation for which part of the student's reasoning is correct and for which part of the student's reasoning is incorrect. • **Reasoning component** = 1 point o The student provides an example using different values for x and y to support his/her explanation. Sample student response: The part of the student's reasoning that is correct is that the value of each expression is the same when $x = 1$ and $y = 1$ is the same. $12.2x + 50.6y + 3(1.4x - 2.6y)$ $12.2(1) + 50.6(1) + 3(1.4(1) - 2.6(1))$ $= 12.2 + 50.6 + 4.2 - 7.8$ $= 59.2$ And $59.2xy = 59.2(1)(1) = 59.2$ The part of the student's reasoning that is incorrect is that the student only checks for one substitution of the x and y values for each expression. In order for the expressions to be equivalent, they must have the same value for all values of x and y. This student has only shown the expressions are equivalent for one pair of values. Using $x = 1$ and $y = 2$ will show the expressions do not always have the same value, so Greg's conjecture is not correct. $12.2x + 50.6y + 3(1.4x - 2.6y)$ $12.2(1) + 50.6(2) + 3(1.4(1) - 2.6(2))$ $= 12.2 + 101.2 + 3(1.4 - 5.2)$ $= 12.2 + 101.2 + 4.2 - 15.6$ $= 102$ And $59.2xy = 59.2(1)(2) = 118.4$ So we see that the two expressions are not equivalent for all values of x and y.
1	Student response includes 1 of the above elements.
0	Student response is incorrect or irrelevant.

Anchor Set
A1 – A9

With Annotations

A1

Part A: Score Point 2
Part B: Score Point 2

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

$12.2x + 50.6y + 3(1.4x - 2.6y)$
Simplifies to
$16.4x + 42.8y$
If you simplify both of the students of expressions, it comes to the same equation, making all equations $equivalent.$
$4(4.1x + 10.7y) = 16.4x + 42.8y$
Which is the same equation as in the teacher's equation.
$2(6.1x + 25.3y + 2.1x - 3.9y) = 2(8.2x + 21.4)$
Which finally simplifies to
$16.4x + 42.8y$

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for x and y to support your answer.

If $x = 1$ and $y = 1$, 59.2xy would be equivalent the the teacher's equation, however, x and y are variables, meaning you don't know the value of them. Also, when he put them together like xy, it means multiplication instead of addition. You can't add coeffictients together. For example, if $x = 2$ and $y = 1$, then the teacher's example is
$12.2(2) + 50.6 + 3(2.8 - 2.6)$
This turns into
$24.4 + 50.6 + 8.4 - 7.8 = 75.6$
$59.2(2) = 118.4$, not 75.6

Annotation

Anchor Paper 1

Part A: Score Point 2

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

- The response provides a correct explanation and work showing expression 1 is equivalent to the teacher's expression. The response shows both the Teachers and Expression 1 simplify to the same expression (16.4x + 42.8y) and explains they simplified (Simplifies to 16.4x + 42.8y) (you simplify . . . the student's of expressions, it comes to the same equation, making all equations *equivalent*).
- The response provides a correct explanation and work showing expression 2 is equivalent to the teacher's expression. The response shows both the Teacher's and expression 2 simplify to the same expression (16.4x + 42.8y) and states they simplified the teacher's expression (Simplifies to 16.4x + 42.8y). Work is shown for combining the like terms inside the parenthesis before distributing the 2 [2(8.2x + 21.4) . . . simplifies to 16.4x + 42.8y]. Although the y is dropped from 21.4 they recover from this error by showing "y" in their final expression (42.8y).

Part B: Score Point 2

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

- The response shows understanding that when the variables are both 1 then the teacher's expression is equivalent to 59.2xy but that it must also be true when the variables are not 1. An explanation is stated for what is correct about the student's reasoning (If x = 1 and y = 1, 59.2xy would be equivalent the the teacher's equation) and what is incorrect about the student's reasoning (x and y are variables, meaning you don't know the value of them. Also, when he put them together like xy, it means multiplication instead of addition. You can't add coefficients together).

- The response provides an example using different values for x and y in the teachers expression 16.4x + 42.8y and in the student's expression 59.2xy to show they are not equivalent [x = 2 and y = 1 . . . 12.2(2) + 50.6 + 3(2.8 – 2.6). This turns into . . . 75.6 59.2(2) = 118.4, not 75.6]. It would be nice to see 1 substituted for x and y in the teacher's expression 16.4x + 42.8y to show they are equivalent but it is not necessary in this response for credit to be earned.

A2

Part A: Score Point 1
Part B: Score Point 2

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

The claim is true because $3(1.4x - 2.6y)$ is $4.2x - 7.8y$. $4.2x + 12.2x = 16.4x$, and $50.6y - 7.8y = 42.8y$. The equation is equal to $16.4x + 42.8y$. Equation 1 is true because $4(4.1x + 10.7y) = 16.4x + 7.8y$. Equation 2 is true because $2(6.1x + 25.3y + 2.1x - 3.9y)$ is equal to $12.2x + 50.6y + 4.2x - 7.8y$ which is equal to $16.4x + 42.8y$.

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for x and y to support your answer.

The student is correct in that the equations are equal when the variables equal one. However, the equation myst be true for any variable, not only one. If $x = 2$ and $y = 3$, then the equation is not equivalent. $xy = 6$, and $59.2 \times 6 = 355.2$. $16.4 \times 2 = 32.8$, and $42.8 \times 3 = 128.4$. $32.8 + 128.4$ does not equal 355.2.

Annotation

Anchor Paper 2

Part A: Score Point 1

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

- The response provides a correct explanation and work showing expression 2 is equivalent to the teacher's expression. The teacher's expression distributes the 3 and then combines like terms to solve [(3(1.4x – 2.6y) is 4.2x – 7.8y. 4.2x + 12.2x =16.4x and 50.6y - 7.8y = 42.8y. The equation is equal to 16.4x + 42.8y)]. Expression 2 is rewritten and solved [2(6.1x + 25.3y + 2.1x - 3.9y] is equal to 12.2x + 50.6y + 4.2x – 7.8y which is equal to 16.4x + 42.8y).

Expression 1 is not shown as equivalent to the teacher's expression due to the incorrect answer provided [4(4.1x + 10.7y) = 16.4x + 7.8y]. 7.8y is stated instead of 42.8y.

Part B: Score Point 2

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

- The response shows understanding that when the variables are both 1 then the teacher's expression is equivalent to 59.2xy but that it must also be true when the variables are not 1. An explanation is stated for what is correct about the student's reasoning (correct in that the equations are equal when the variables equal one) and what is incorrect about the student's reasoning (the equation myst be true for any variable, not only one).

- The response provides an example using different values for x and y in the teacher's expression 16.4x + 42.8y and in the student's expression 59.2xy to show they are not equivalent (If x = 2 and y = 3, then the equation is not equivalent xy = 6, and 59.2 X 6 = 355.2. 16.4 X 2 = 32.8, and 42.8 X 3=128.4. 32.8 + 128.4 does not equal 355.2).

A3

Part A: Score Point 1
Part B: Score Point 2

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

Expression 1:
$4(4.1x + 10.7y)$
$4(4.1x) + 4(10.7y)$
$16.4x + 42.8y$

Expression 2:
$2(6.1x + 25.3y + 2.1x - 3.9y)$
$2(6.1x) + 2(25.3y) + 2(2.1x) - 2(3.9y)$
$12.2x + 50.6y + 4.2x - 7.8y$
$16.4x + 42.8y$

The student's claim is correct for both expressions because when simplified expression $1 = expression\ 2$.

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for *x* and *y* to support your answer.

The student is correct when you substitute 1 for both x and y, but he is not correct because if the values of x and y are diffrent the the students answer does not equal the teacher's answer.
If $x = 2$ and $y = 3$ the teacher'sexpression equals 161.2 while the student's equals 355.2.

Annotation

Anchor Paper 3

Part A: Score Point 1

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

- The response provides an explanation and work showing Expression 1 is equivalent to Expression 2. Expression 1 is rewritten and solved [4(4.1x) + 4(10.7y) 16.4x + 42.8y] Expression 2 is rewritten and solved [(2(6.1x) + 2(25.3y) + 2(2.1x) – 2(3.9y) 12.2x + 50.6y + 4.2x – 7.8y 16.4x + 42.8y. The student's claim is correct for both expressions because when simplified expression 1 = *expression* 2].

The teacher's expression is not addressed.

Part B: Score Point 2

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

- The response shows understanding that when the variables are both 1 then the teacher's expression is equivalent to 59.2xy but that it must also be true when the variables are not 1. An explanation is stated for what is correct about the student's reasoning (The student is correct when you substitute 1 for both x and y) and what is incorrect about the student's reasoning (but he is not correct because if the values of x and y are diffrent the students answer does not equal the teacher's answer).

- The response provides an example using different values for x and y in the teacher's expression 16.4x + 42.8y and in the student's expression 59.2xy to show they are not equivalent (If x = 2 and y = 3, the teacher's expression equals 161.2 while the student's equals 355.2). This work is weak but acceptable. The correct totals for the two expressions are sufficient to show support that the claim is incorrect.

A4

Part A: Score Point 2
Part B: Score Point 0

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

Because the expression on the board simpifies to 16.4x $+42.8$.
$4(4.1x) = 16.4x$ and
$4(10.7y) = 42.8y$ so expression 1 simplifys the same too,
$16.4x + 42.8y$ and so does expression 2 $2(6.1x) = 12.2x$
$2(25.3y) = 50.6$y
$2(2.1x) = 4.2x$
y
$2(3.9y) = 7.8y$ when like terms are added the second expression simplifies to $16.4x + 42.8y$

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for x and y to support your answer.

yes if $x = 1$ and y did too that would work but we arent sure what they equal. For example if $x = 5$ and $y = 7$ then that wouldnt work.

Annotation

Anchor Paper 4

Part A: Score Point 2

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

- The response provides a correct explanation and work showing expression 1 is equivalent to the teacher's expression. The work for the teacher's expression is minimal but sufficient by stating what it simplifies to (the expression on the board simpifies to 16.4x + 42.8). Expression 1 is solved [4(4.1x) = 16.4x and 4(10.7y) = 42.8y so expression 1 simplifys the same too].

- The response provides a correct explanation and work showing expression 2 is equivalent to the teacher's expression [2(6.1x) = 12.2x 2(25.3y) = 50.6y; 2(2.1x) = 4.2x 2 (3.9y) = 7.8y when like terms are added the second expression simplifies to 16.4x + 42.8y]. The teacher's expression was correctly stated (16.4x + 42.8y). The response shows both expressions are equivalent and provides sufficient work.

Part B: Score Point 0

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

The response gives a vague explanation for what is correct about the student's reasoning (if x = 1 and y did too that would work) but we need to distinguish between a connection for what is correct and incorrect about the claim and simply repeating parts of the prompt. There is no reasoning shown for what is incorrect about the claim (x = 5 and y = 7 then that wouldnt work). Just stating values for x and y is not sufficient. The response needs to show understanding that the expressions are equivalent when the variables are both 1 but not equivalent with any number other than 1. It needs to clearly convey in the wording that this understanding is present.

There is no example or numeric support provided using different values for x and y in both the teacher's and student's expressions to show they are not equivalent.

A5

Part A: Score Point 2
Part B: Score Point 0

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

The teacher's expression is equal to $16.4x + 42.8y$. Both of the student's expressions are equal to $16.4x + 42.8y$ too.
Expression 1:
$4(4.1x + 10.7y)$
$16.4x + 42.8y$
Expression 2:
$2(6.1x + 25.3y + 2.1x - 3.9y)$
$12.2x + 50.6y + 4.2x - 7.8y$
$16.4x + 42.8y$

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for x and y to support your answer.

59.2xy is not equal to the teacher's expression because if $y = 1$ and $x = 1$ then the teacher's expression would equal 67.6.
Their expression would be correct if he used a different number for either x or y.
Ex: $x = 1$ and $y = .5$

Annotation

Anchor Paper 5

Part A: Score Point 2

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

- The response provides a correct explanation and work showing expression 1 is equivalent to the teacher's expression. The teacher's expression is correctly stated (The teacher's expression is equal to 16.4x + 42.8y). Expression 1 is rewritten and distributed correctly (16.4x + 42.8y). The response shows both expressions are equivalent with minimal work.

- The response provides a correct explanation and work showing expression 2 is equivalent to the teacher's expression. The teacher's expression is correctly stated (The teacher's expression is equal to 16.4x + 42.8y). Expression 2 is rewritten and solved (12.2x + 50.6y + 4.2x - 7.8y 16.4x + 42.8y). The response shows both expressions are equivalent with work.

Part B: Score Point 0

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

The reasoning for what is correct and incorrect about the student's claim is incorrect and reversed (59.2xy is not equal to the teacher's expression because if y = 1 and x = 1 then the teacher's expression would equal 67.6. Their expression would be correct if he used a different number for either x or y).

There is no example or numeric support provided.

A6

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

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

$$\text{Expression 1: } 4(4.1x + 10.7y)$$

$$\text{Expression 2: } 2(6.1x + 25.3y + 2.1x - 3.9y)$$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

it is true because the equation thge teacher said was ⬚ = ⬚ to the equation the student said

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for x and y to support your answer.

he is correct because ehen they are both $x = 1$ and $y = 1$, they are equal but when the variables are different, they are not equivelant.

Annotation

Anchor Paper 6

Part A: Score Point 0

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

There is no relevant comparison stated and no numeric support provided (it is true because the equation thge teacher said). Just stating true is not relevant.

Part B: Score Point 1

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

- The response shows understanding that when the variables are both 1 then the teacher's expression is equivalent to 59.2xy but that it must also be true when the variables are not 1. An explanation is stated for what is correct about the student's reasoning (he is correct because ehen they are both x=1 and y=1, they are equal) and what is incorrect about the student's reasoning (but when the variables are different, they are not equivelant). The response shows understanding that two expressions are equivalent only when the variables are both 1 and otherwise they are not equivalent.

There is no example or numeric support provided using different values for x and y in the teacher's expression 16.4x + 42.8y and in the student's expression 59.2xy to show they are not equivalent.

A7

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

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

$4(4.1 + 10.7)$
$4.1 + 10.7 = 14.8$
$14.8 \times 4 = 59.2$

$2(6.1 + 25.3 + 2.1 - 3.9)$
$6.1 + 25.3 + 2.1 - 3.9 = 29.6$
$29.6 \times 2 = 59.2$
She is right because she did the same equation, she just shortened it down more for number one. then for number two, she put in different numbers but you still got the same sum at the end.

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for *x* and *y* to support your answer.

The students reasoning is correct because if you took $59.2 \times 1 \times 1$ it would equal 59.2 and that is the same answer in the teachers expression too. The students reasoning is incorrect because other people might put in different numbers for x and y so then it wouldnt be equivalent anymore. For example, if someone said $x = 3$ and $y = 2$ then your answer wouldnt be 59.2 anymore, it would be 355.2.

Annotation

Anchor Paper 7

Part A: Score Point 0

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

The teacher's expression is not addressed. The process error of dropping variables prevents any credit from being earned (14.8 X 4 = 59.2).

Part B: Score Point 1

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

- The response shows understanding that when the variables are both 1 then the teacher's expression is equivalent to 59.2xy but that it must also be true when the variables are not 1. The explanation stated for what is correct about the student's reasoning follows through from an error in Part A (correct because if you took 59.2 X 1 X 1 it would equal 59.2 and that is the same answer in the teachers expression too). A correct explanation is given for what is incorrect about the student's reasoning (incorrect because other people might put in different numbers for x and y so then it wouldn't be equivalent anymore). The response shows understanding that two expressions are equivalent only when the variables are both 1 and otherwise they are not equivalent.

An incomplete example is provided (x = 3 and y = 2 then your answer wouldn't be 59.2 anymore, it would be 355.2). There is no comparison to the teacher's expression which is needed to support the expressions not being equivalent.

Part B: Score Point 0

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

$10.7 + 4.1 \times 2 = 59.2$
$25.3 + 6.1 + 2.1 - 3.9 = 59.2$

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for x and y to support your answer.

He is correct because if you switch around a problem with the same numbers it stays the same. He is incorrect because it might not be the exact formula as his. $((8x) \times 9)y$

Annotation

Anchor Paper 8

Part A: Score Point 0

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

There are no variables used and the math shown is incorrect (10.7 + 4.1 X 2 =59.2, 25.3 + 6.1 + 2.1 – 3.9 = 59.2). Since the first equation does not have parenthesis it would equal 18.9 and the second equations would equal 29.6.

Part B: Score Point 0

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

There is no support that the student's expression is equivalent to the teacher's expression when x =1 and y = 1. The explanations for the student's reasoning are incorrect (incorrect because it might not be the exact formula as his). The work provided is not relevant to the problem asked and there is no example or numeric support provided.

A9

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

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

The student's claim is not true because the first expression is 27.1 and the secong expression is 35.7

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for *x* and *y* to support your answer.

The student's part reasoning that he is correct is that $X = 1$ and $Y = 1$ but the thing he did wrong was when he multiplied it and the correct answer is 89.52

Annotation

Anchor Paper 9

Part A: Score Point 0

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

The response provides incorrect answers. The incorrect answers with no supporting work shows a lack of understanding (claim is not true because the first expression is 27.1 and the secong expression is 35.7).

Part B: Score Point 0

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

There is no support that the student's expression is equivalent to the teacher's expression when x =1 and y = 1. The explanations for what is correct and incorrect about the student's reasoning is incorrect (he multiplied it and the correct answer is 89.52). The work provided is not relevant to the problem asked. There is no example or numeric support provided.

Practice Set
P101 - P105

No Annotations Included

P101-a

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

Expression 1: $4(4.1x + 10.7y)$
To find out if this expression is equivalent to
$12.2x + 50.6y + 3(1.4x - 2.6Y)$
I need to simplify it. First I distrbute.
$(3 \times 1.4)x - (3 \times 2.6)y = 4.2x - 7.8y$
So now the expression reads
$12.2x + 50.6y + 4.2x - 7.8y$
Now we need to combine like terms.We change the expression to
$12.2x + 4.2x + 50.6y - 7.8y$
Now we do the math.
$12.2x + 4.2x = 16.4x$
$50.6y - 7.8y = 42.8y$ The teacher's expression equals
$16.4x + 42.8y$.
To find out if the student's expression equals the teachers, we need to simplify it. First we distribute.
$(4 \times 4.1)x + (4 \times 10.7)y = 16.4x + 42.8y$
So the student's expression 1 is equivalent to the teacher's.
Expression 2: We want to simplify this expression to see if it equals the teacher's expression,
$16.4x + 42.8y$. First, we distribute.
$2(6.1x + 25.3y + 2.1x - 3.9y)$
This equals
$(2 \times 6.1)x + (2 \times 25.3)y + (2 \times 2.1)x - (2 \times 3.9)$
This is
$12.2x + 50.6y + 4.2x - 7.8yNow$
we need to combine like terms.
$12.2x + 4.2x + 50.6y - 7.8y$
which is $16.4x + 42.8y$.
So both expression equal the teacher's.

P101-b

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for x and y to support your answer.

This is the teacher's expression: $16.4x + 42.8y$. The student says that both x and $y = 1$. So that would mou cannot addean that $16.4(1) = 16.4$, and that $42.8(1) = 42.8$. so $16.4 + 42.8 = 59.2$. This does equal the techer's expression when $x = 1$ and $y = 1$. It would not be 59.2xy because you can't add $16.4x + 42.8y$ because they have different variables. So the student is incorrect. If you were multiplying the two numbers without knowing what the variables were, then you could have a variable of xy.

P102

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

$12.2x + 50.6y + 3(1.4x - 2.5y)$
$12.2x + 1.4x + 3(50.6y - 2.5y)$
$x = 16.6, y = 48.1$

ex1:$4(4.1x + 10.7y)$
$4(582.73)$
2330.92

ex2
:$2(6.1x + 25.3y + 2.1x - 3.9y)$
$2(6.1x + 2.1x + 25.3y + 3.9y)$
$2(8.2x + 29.2y)$
3081.28

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for *x* and *y* to support your answer.

I do not think that any of the students reasoning was correct because two different variables can not have the same the value. It would rather have it be all x or all y.

P103

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

$4(4.1x + 10.7y)$
$16.4x + 42.8y$

$2(6.1x + 25.3y + 2.1x - 3.9y)$
$12.2x + 50.6y + 4.2x + (-7.8y)$
$16.4x + 42.8y$

Both answers have the same solution.

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for *x* and *y* to support your answer.

The sum of the answers of the equation are correct. However, x and y are not always 1.

$16.4(2) + 42.8(2)$
$32.8 + 85.6$
118.4

$59.2(2)(2)$
236.8

Therfore, this would only work if x and y were both 1.

P104

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

$$\text{Expression 1: } 4(4.1x + 10.7y)$$

$$\text{Expression 2: } 2(6.1x + 25.3y + 2.1x - 3.9y)$$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

Expression 1: The accociative property of multiplcation

Expression 2: The communitive property of multiplcation

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for x and y to support your answer.

The student is right about the two expressions having the same value when $x = 1$ and $y = 1$. However, the student is incorrect when it talks about the two equations being equivalent. Just because they have the same values when $x = 1$ and $y = 1$ doesn't make it equivalent.

Example: $x = 10$
$y = 15$

P105

A teacher writes the expression shown on the board.

$12.2x + 50.6y + 3(1.4x - 2.6y)$

Part A

A student writes the two expressions shown.

Expression 1: $4(4.1x + 10.7y)$

Expression 2: $2(6.1x + 25.3y + 2.1x - 3.9y)$

The student claims that both of the expressions are equivalent to the expression written on the board. Explain why the student's claim is true. Show your work for both expressions.

$12.2x + 50.6y + 3(1.4x - 2.6y = 16.4x + 42.8y$

$4(4.1x + 10.7)$

$= 16.4x + 42.8y$

$2(6.1x + 25.3y + 2.1x - 3.9y)$

$= 16.4x + 42.8y$

Part B

A different student claims that the expression $59.2xy$ is equivalent to the teacher's expression. The student's reasoning is shown.

The expression $59.2xy$ is equivalent to the teacher's expression because both expressions have the same value when $x = 1$ and $y = 1$. This means that the two expressions are equivalent.

- Explain which part of the student's reasoning is correct.
- Explain which part of the student's reasoning is incorrect.
- Give an example using different values for x and y to support your answer.

The student is correct because when y and x bothe equal 1, then the answer would be 59.2xy. But if x and y equal something else the answer would be totally different. If x equals 2 and y equals 3 then the answer would be 161.2xy.

Practice Set

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