Lesson 17: Write Expressions in Which Letters Stand for Numbers

Student Outcomes

- Students write algebraic expressions that record all operations with numbers and/or letters standing for the numbers.

Lesson Notes

Large paper is needed to complete this lesson.

Classwork

Fluency Exercise (5 minutes): Addition of Decimals

Sprint: Refer to the Sprints and Sprint Delivery Script sections in the Module Overview for directions on how to administer a Sprint.

Opening (5 minutes)

Discuss the Exit Ticket from Lesson 16. Students will be continuing to work on writing expressions, so discuss any common mistakes from the previous lesson.

Exercises (25 minutes)

Students work in groups of two or three to complete the stations. At each station, students write down the problem and the expression with variables and/or numbers. Encourage students to underline key words in each problem.

Exercises

Station One:

1. The sum of a and b.

    $a + b$

2. Five more than twice a number c.

    $5 + 2c$ *or* $2c + 5$

3. Martha bought d number of apples and then ate 6 of them.

    $d - 6$

> *Scaffolding:*
>
> If students struggled during Lesson 16, complete some examples with students before moving into the exercises.

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Station Two:

1.   **14 decreased by p.**

   $14 - p$

2.   **The total of d and f, divided by 8.**

   $\frac{d+f}{8}$ *or* $(d + f) \div 8$

3.   **Rashod scored 6 less than 3 times as many baskets as Mike. Mike scores b baskets.**

   $3b - 6$

Station Three:

1.   **The quotient of c and 6.**

   $\frac{c}{6}$

2.   **Triple the sum of x and 17.**

   $3(x + 17)$

3.   **Gabrielle had b buttons but then lost 6. Gabrielle took the remaining buttons and split them equally among her 5 friends.**

   $\frac{b-6}{5}$ *or* $(b - 6) \div 5$

Station Four:

1.   **d doubled.**

   $2d$

2.   **Three more than 4 times a number x.**

   $4x + 3$ *or* $3 + 4x$

3.   **Mali has c pieces of candy. She doubles the amount of candy she has then gives away 15 pieces.**

   $2c - 15$

Station Five:

1.   **f cubed.**

   f^3

2.   **The quantity of 4 increased by a, and then the sum is divided by 9.**

   $\frac{4+a}{9}$ *or* $(4 + a) \div 9$

3.   **Tai earned 4 points fewer than double Oden's points. Oden earned p points.**

   $2p - 4$

Station Six:

1. **The difference between** d **and 8.**

    $d - 8$

2. **6 less than the sum of** d **and 9.**

    $(d + 9) - 6$

3. **Adalyn has** x **pants and** s **shirts. She combined them and sold half of them. How many items did Adalyn sell?**

    $\frac{x+s}{2}$ or $\frac{1}{2}(x + s)$

When students reach the final station, they complete the station on larger paper. Students should put all of their work on the top half of the paper.

MP.3
After all students have completed every station, they travel through the stations again to look at the answers provided on the larger paper. Students compare their answers with the answers at the stations and leave feedback on the bottom half of the paper. This may be positive feedback ("I agree with all of your answers," or "Great job") or critiques ("I think your subtraction is in the incorrect order," or "Why did you write your answer in that order?").

Closing (5 minutes)

Discuss feedback that was left on the larger sheets of paper. This will answer any questions and will provide an opportunity to discuss common mistakes.

- Is it possible to have more than one correct answer? Why or why not?
  - *When writing some of the expressions, it is possible to have more than one correct answer. For example, when writing an expression with addition, the order can be different. Also, we learned how to write division expressions in more than one way.*

Exit Ticket (5 minutes)

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Exit Ticket

Write an expression using letters and/or numbers for each problem below.

1. d squared.

2.   A number x increased by 6 and then the sum is doubled.

3.   The total of h and b is split into 5 equal groups.

4.   Jazmin has increased her \$45 by m dollars and then spends a third of the entire amount.

5.   Bill has d more than 3 times the number of baseball cards as Frank. Frank has f baseball cards.

Exit Ticket Sample Solutions

Write an expression using letters and/or numbers for each problem below.

1. d **squared.**

   d^2

2. **A number x increased by 6 and then the sum is doubled.**

   $2(x + 6)$

3. **The total of h and b is split into 5 equal groups.**

   $\dfrac{h+b}{5}$ *or* $(h + b) \div 5$

4. **Jazmin has increased her $\$45$ by m dollars and then spends a third of the entire amount.**

   $\dfrac{45 + m}{3}$ *or* $\dfrac{1}{3}(45 + m)$

5. **Bill has d more than 3 times the number of baseball cards as Frank. Frank has f baseball cards.**

   $3f + d$ *or* $d + 3f$

Problem Set Sample Solutions

Write an expression using letters and/or numbers for each problem below.

1. **4 less than the quantity of 8 times n.**

   $8n - 4$

2. **6 times the sum of y and 11.**

   $6(y + 11)$

3. **The square of m reduced by 49.**

   $m^2 - 49$

4. **The quotient when the quantity of 17 plus p is divided by 8.**

   $\dfrac{17+p}{8}$ *or* $(17 + p) \div 8$

5. **Jim earned j in tips, and Steve earned s in tips. They combine their tips then split them equally.**

   $\dfrac{j+s}{2}$ *or* $(j + s) \div 2$

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6. Owen has c collector cards. He quadruples the number of cards he has, and then combines them with Ian, who has i collector cards.

   $4c + i$

7. Rae runs 4 times as many miles as Madison and Aaliyah combined. Madison runs m miles and Aaliyah runs a miles.

   $4(m + a)$

8. By using coupons, Mary Jo is able to decrease the retail price of her groceries, g, by $\$125$.

   $g - 125$

9. To calculate the area of a triangle, you find the product of the base and height and then divide by 2.

   $\dfrac{bh}{2}$ or $bh \div 2$

10. The temperature today was 10 degrees colder than twice yesterday's temperature, t.

    $2t - 10$

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Addition of Decimals–Round 1

Number Correct: _____

Directions: Determine the sum of the decimals.

1.	$1.3 + 2.1$		18.	$14.08 + 34.27$	
2.	$3.6 + 2.2$		19.	$24.98 + 32.05$	
3.	$8.3 + 4.6$		20.	$76.67 + 40.33$	
4.	$14.3 + 12.6$		21.	$46.14 + 32.86$	
5.	$21.2 + 34.5$		22.	$475.34 + 125.88$	
6.	$14.81 + 13.05$		23.	$561.09 + 356.24$	
7.	$32.34 + 16.52$		24.	$872.78 + 135.86$	
8.	$56.56 + 12.12$		25.	$788.04 + 324.69$	
9.	$78.03 + 21.95$		26.	$467 + 32.78$	
10.	$32.14 + 45.32$		27.	$583.84 + 356$	
11.	$14.7 + 32.8$		28.	$549.2 + 678.09$	
12.	$24.5 + 42.9$		29.	$497.74 + 32.1$	
13.	$45.8 + 32.4$		30.	$741.9 + 826.14$	
14.	$71.7 + 32.6$		31.	$524.67 + 764$	
15.	$102.5 + 213.7$		32.	$821.3 + 106.87$	
16.	$365.8 + 127.4$		33.	$548 + 327.43$	
17.	$493.4 + 194.8$		34.	$108.97 + 268.03$	

Addition of Decimals–Round 1 [KEY]

Directions: Determine the sum of the decimals.

1.	1.3 + 2.1	**3.4**	18.	14.08 + 34.27	**48.35**
2.	3.6 + 2.2	**5.8**	19.	24.98 + 32.05	**57.03**
3.	8.3 + 4.6	**12.9**	20.	76.67 + 40.33	**117**
4.	14.3 + 12.6	**26.9**	21.	46.14 + 32.86	**79**
5.	21.2 + 34.5	**55.7**	22.	475.34 + 125.88	**601.22**
6.	14.81 + 13.05	**27.86**	23.	561.09 + 356.24	**917.33**
7.	32.34 + 16.52	**48.86**	24.	872.78 + 135.86	**1008.64**
8.	56.56 + 12.12	**68.68**	25.	788.04 + 324.69	**1112.73**
9.	78.03 + 21.95	**99.98**	26.	467 + 32.78	**499.78**
10.	32.14 + 45.32	**77.46**	27.	583.84 + 356	**939.84**
11.	14.7 + 32.8	**47.5**	28.	549.2 + 678.09	**1227.29**
12.	24.5 + 42.9	**67.4**	29.	497.74 + 32.1	**529.84**
13.	45.8 + 32.4	**78.2**	30.	741.9 + 826.14	**1568.04**
14.	71.7 + 32.6	**104.3**	31.	524.67 + 764	**1288.67**
15.	102.5 + 213.7	**316.2**	32.	821.3 + 106.87	**928.17**
16.	365.8 + 127.4	**493.2**	33.	548 + 327.43	**875.43**
17.	493.4 + 194.8	**688.2**	34.	108.97 + 268.03	**377**

Addition of Decimals–Round 2

Number Correct: _____

Directions: Determine the sum of the decimals.

Improvement: _____

1.	$3.4 + 1.2$	
2.	$5.6 + 3.1$	
3.	$12.4 + 17.5$	
4.	$10.6 + 11.3$	
5.	$4.8 + 3.9$	
6.	$4.56 + 1.23$	
7.	$32.3 + 14.92$	
8.	$23.87 + 16.34$	
9.	$102.08 + 34.52$	
10.	$35.91 + 23.8$	
11.	$62.7 + 34.89$	
12.	$14.76 + 98.1$	
13.	$29.32 + 31.06$	
14.	$103.3 + 32.67$	
15.	$217.4 + 87.79$	
16.	$22.02 + 45.8$	
17.	$168.3 + 89.12$	

18.	$67.82 + 37.9$	
19.	$423.85 + 47.5$	
20.	$148.9 + 329.18$	
21.	$4 + 3.25$	
22.	$103.45 + 6$	
23.	$32.32 + 101.8$	
24.	$62.1 + 0.89$	
25.	$105 + 1.45$	
26.	$235.91 + 12$	
27.	$567.01 + 432.99$	
28.	$101 + 52.3$	
29.	$324.69 + 567.31$	
30.	$245 + 0.987$	
31.	$191.67 + 3.4$	
32.	$347.1 + 12.89$	
33.	$627 + 4.56$	
34.	$0.157 + 4.56$	

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Addition of Decimals–Round 2 [KEY]

Directions: Determine the sum of the decimals.

1.	$3.4 + 1.2$	**4.6**	18.	$67.82 + 37.9$	**105.72**
2.	$5.6 + 3.1$	**8.7**	19.	$423.85 + 47.5$	**471.35**
3.	$12.4 + 17.5$	**29.9**	20.	$148.9 + 329.18$	**478.08**
4.	$10.6 + 11.3$	**21.9**	21.	$4 + 3.25$	**7.25**
5.	$4.8 + 3.9$	**8.7**	22.	$103.45 + 6$	**109.45**
6.	$4.56 + 1.23$	**5.79**	23.	$32.32 + 101.8$	**134.12**
7.	$32.3 + 14.92$	**47.22**	24.	$62.1 + 0.89$	**62.99**
8.	$23.87 + 16.34$	**40.21**	25.	$105 + 1.45$	**106.45**
9.	$102.08 + 34.52$	**136.6**	26.	$235.91 + 12$	**247.91**
10.	$35.91 + 23.8$	**59.71**	27.	$567.01 + 432.99$	**1000**
11.	$62.7 + 34.89$	**97.59**	28.	$101 + 52.3$	**153.3**
12.	$14.76 + 98.1$	**112.86**	29.	$324.69 + 567.31$	**892**
13.	$29.32 + 31.06$	**60.38**	30.	$245 + 0.987$	**245.987**
14.	$103.3 + 32.67$	**135.97**	31.	$191.67 + 3.4$	**195.07**
15.	$217.4 + 87.79$	**305.19**	32.	$347.1 + 12.89$	**359.99**
16.	$22.02 + 45.8$	**67.82**	33.	$627 + 4.56$	**631.56**
17.	$168.3 + 89.12$	**257.42**	34.	$0.157 + 4.56$	**4.717**

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