48. Denzel wants to know the total number of boys in the three clubs shown in the table.

Club Membership		
Club	Boys	Girls
chess	17	19
drama	28	23
music	13	21

a. What expression should Denzel evaluate in order to find the total number of boys?

b. Explain how you can use properties of numbers to make the expression easier to evaluate using mental math.

PLANET Movie
$5(4.50) + 5(7.75) =$
Admission
$5a + 61.25$

49. Financial Literacy The Center of Wonders science center has the rates shown.

Center of Wonders	
Type of Ticket	Cost ($)
admission	a
planetarium	4.50
3-D movie	7.75

a. Write an algebraic expression for the total cost for five people to get into the center, visit the planetarium, and watch a 3-D movie.

b. If the cost of admission to the center is $12, how much will it cost for four people to get into the center and watch a 3-D movie?

"a"
$4(12) + 4(7.75) =$
$79

c. Children get a discount of $2.50 on their tickets to the planetarium if they also see a 3-D movie. Write an expression to find the cost for two adults and two children to get into the center, see a 3-D movie, and visit the planetarium.

$2(12) + 2(9.5) + 4(7.75) + 4(4.5)$
$24 + 19 + 31 + 18$
$24 + 50 + 18$
$74 + 18$
$92

H.O.T. Problems Higher Order Thinking

50. CCSS **Identify Structure** Write an algebraic expression that can be simplified using at least two different properties. Simplify the expression showing each step and provide a justification for each step.

51. CCSS **Construct an Argument** Is the following statement *true* or *false*? Explain your reasoning.

$$15 + (4 \cdot 6) = (15 + 4) \cdot 6$$

52. CCSS **Find the Error** Meghan is simplifying the expression $8(3) \cdot 4 \cdot 2(3)$. Find her mistake and correct it.

$$\begin{aligned} 8(3) \cdot 4 \cdot 2(3) &= 24 \cdot 4 \cdot 2 \\ &= 96 \cdot 2 \\ &= 192 \end{aligned}$$

THE SET OF WHOLE NUMBERS
{WHOLE NUMBERS}

53. CCSS **Persevere with Problems** If you take any two whole numbers and add them together, the sum is always a whole number. This is the Closure Property for Addition. The set of whole numbers is *closed* under addition.

a. Is the set of whole numbers closed under subtraction? If not, give a counterexample. No
$4 - 5 = (-1)$ NOT A WHOLE NUMBER

b. Suppose you had a very small set of numbers that contained only 0 and 1. Would this set be closed under addition? If not, give a counterexample. No $1 + 1 = 2$ NOT PART OF $\{0, 1\}$

c. There is also a Closure Property for Multiplication of Whole Numbers. State this property using the addition property above as a guideline. WHOLE NUMBER × WHOLE NUMBER = ALWAY ANOTHER WHOLE NUMBER

d. Is the set {0, 1} closed under multiplication? Explain.
$0 \times 1 = 0$ $1 \times 1 = 1$ $0 \times 0 = 0$

54. **Building on the Essential Question** The number 1 is the identity for multiplication. Do you think that division has an identity? Explain your reasoning.

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