Name _____ Class _____ Date _____

1-4 Homework

Match statements 1–8 with the property, a – h, that the statement illustrates.

a Commutative Property of Addition:	$a + b = b + a$
b. Commutative Property of Multiplication:	$a \cdot b = b \cdot a$
c. Additive Identity:	$a + 0 = a$
d. Multiplicative Identity:	$a \cdot 1 = a$
e. Associative Property of Addition:	$(a + b) + c = a + (b + c)$
f. Associative Property of Multiplication:	$(a \cdot b) \cdot c = a \cdot (b \cdot c)$
g. Zero Property of Multiplication:	$a \cdot 0 = 0$
h. Multiplicative Property of –1:	$-1 \cdot a = -a$

1. $12 + 917 = 917 + 12$

2. $5 \cdot 0 = 0$

3. $35 \cdot x = x \cdot 35$

4. $(x \cdot 3) \cdot 4 = x \cdot (3 \cdot 4)$

5. $m + 0 = m$

6. $25 \cdot 1 = 25$

7. $(15 + 9) + 11 = 15 + (9 + 11)$

8. $-1 \cdot 6 = -6$

Simplify each expression. Justify each step that has not been justified.

9. $5 + (3x + 2) = 5 + (2 + 3x)$ — Commutative Property of Addition

$= (5 + 2) + 3x$ — _____

$= 7 + 3x$ — Combine like terms.

10. $3 \cdot (x \cdot 6) = 3 \cdot (6 \cdot x)$ — _____

$= (3 \cdot 6) \cdot x$ — Associative Property of Multiplication

$= 18x$ — Multiply.

Name _____ Class _____ Date _____

1-4 Homework (continued)

Simplify each expression. Justify each step.

11. $(2 + 7m) + 5$

12. $9 \cdot (r \cdot 21)$

Tell whether the expressions in each pair are equivalent.

13. $2x$ and $2x \cdot 1$

14. $(5 - 2) \cdot x$ and $3x$

15. $8 + 6 + b$ and $8 + 6b$

16. $5 \cdot (4 - 4)$ and 0

17. You have prepared 40 mL of vanilla, 20 mL of chocolate, and 50 mL of milk for a milkshake.

a. How many milliliters of milkshake will you have if you first pour the vanilla, then the chocolate, and finally the milk into your glass?

b. How many milliliters of milkshake will you have if you first pour the chocolate, then the vanilla, and finally the milk into your glass?

c. Explain how you can tell whether the amounts of milkshake described in parts (a) and (b) are equal.

Use deductive reasoning to tell whether each statement is *true* or *false*. If it is false, give a counterexample.

18. For all real numbers a and b, $a - b = b - a$.

19. For all real numbers p, q, and r, $p - q - r = p - r - q$.

20. For all real numbers x, y, and z, $(x + y) + z = z + (x + y)$.

21. For all real numbers n, $n + 1 = n$.

22. Writing Explain why the commutative and associative properties do not hold true for subtraction and division.