Foundations of Algebra
Unit 2 Review

1. Which property is illustrated by the equation $ma + mb = m(a + b)$?
   a. Associative
   b. Commutative
   (c.) Distributive
   d. Identity

2. $3 + 4 = 4 + 3$ is an example of which property?
   a. Associative
   (b.) Commutative — numbers switch places
   c. Distributive
   d. Identity

3. Which of the following illustrates the associative property of addition?
   (a.) $8 + (3 + 9) = (8 + 3) + 9$ — parenthesis move
   b. $8 + 12 = 12 + 8$
   c. $8(3 + 9) = 8 \cdot 3 + 8 \cdot 9$
   d. $8 + (-8) = 0$

4. Which property is illustrated by the statement: $(24 \cdot 9) \cdot 0 = 0$?
   a. Commutative property of multiplication
   b. Associative property of multiplication
   c. Identity property of multiplication
   (d.) Zero property of multiplication

5. Which property is illustrated by the equation: $54a + 0 = 54a$?
   a. Commutative property of addition
   b. Additive inverse property
   (c.) Additive identity property — number stays the same
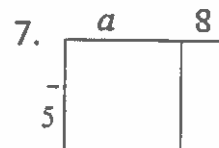   d. Distributive property

Write the area of each rectangle as the product of *length × width* and also as a sum of the areas of each box.

Ex.
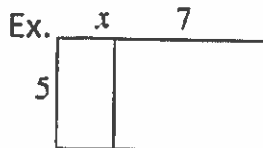
AREA AS PRODUCT	AREA AS SUM
$5(x+7)$	$5x+35$

6.
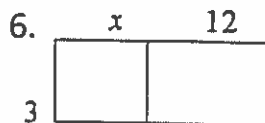
AREA AS PRODUCT	AREA AS SUM
$3(x+12)$	$3x+36$

7.

AREA AS PRODUCT	AREA AS SUM
$5(a+8)$	$5a+40$

Use the distributive property to simplify the following:

8. $7(x + 2) = 7x + 14$

9. $2(x - 3) = 2x - 6$

10. Match each phrase with the correct algebraic expression.

_f_ The sum of nine and a number	a. $2n + 5$
_e_ Fourteen decreased by a number	b. $t - 7$
_b_ Seven less than a number	c. $\frac{7}{2n}$
_g_ The product of 9 and a number	d. $6n$
_h_ Thirty-two divided by a number	e. $14 - p$
_a_ Five more than twice a number	f. $9 + x$
_d_ The product of a number and 6	g. $9n$
_C_ Seven divided by twice a number	h. $\frac{32}{y}$

Evaluate the following expressions using the given values for the variables.

11) $10 - x + y \div 2$; use $x = 5$, and $y = 2$

$10 - 5 + 2 \div 2$
$10 - 5 + 1$
$5 + 1$
$\boxed{6}$

12) $p - 2 + qp$; use $p = 7$, and $q = 4$

$7 - 2 + 4(7)$
$7 - 2 + 28$
$5 + 28$
$\boxed{33}$

13) $zy + 4y$; use $y = 5$, and $z = 2$

$2(5) + 4(5)$
$10 + 20$
$\boxed{30}$

14) $b(a + b) + a$; use $a = 9$, and $b = 4$

$4(9 + 4) + 9$
$4(13) + 9$
$52 + 9$
$\boxed{61}$

Use the laws of exponents to simplify the following expressions.

15. $a^6 \cdot a^3$

a^9

add exponents

16. $(x^5)^2$

x^{10}

multiply exponents

17. $(4a^2b^3)^5$

$4^5 a^{10} b^{15}$ multiply each exponent

18. $\dfrac{x^8}{x^6} = x^2$

Subtract
exponents

19. $\dfrac{x^6}{x^6} = x^0 = 1$

Subtract
exponents

20. $\left(2^3 x^2\right)^5$

$2^{15} x^{10}$

multiply
each
exponent

21. $\left(4x^2 y^5\right)^{-2}$

$4^{-2} x^{-4} y^{-10} = \dfrac{1}{4^2 x^4 y^{10}}$

mult. each exponent
negatives move to denominator

22. $\dfrac{x^5 y^2}{x^4 y^0} = x^1 y^2$

Subtract
exponents

23. $\left(x^3\right)^0 = x^0 = 1$

multiply exponents
Zero exponent = 1

Evaluate.

24. $\sqrt{49} = 7$

25. $\sqrt[3]{27} = 3$

26. $\sqrt{81} = 9$

27. $\sqrt{25} = 5$

28. $\sqrt[3]{8} = 2$

29. $\sqrt{121} = 11$

30. $\sqrt{16} = 4$

31. $\sqrt[3]{64} = 4$

32. $\sqrt{169} = 13$