

1.3 Algebraic Properties

ALGEBRA

Write your questions here!

EXPRESSIONS

Numeric Expression

Algebraic Expression

COMMUTATIVE PROPERTY

ADDITION

MULTIPLICATION

ASSOCIATIVE PROPERTY

ADDITION

MULTIPLICATION

Determine if the expressions are equivalent. If so, state the property used to show equivalence.

	$8 - 6 = 6 - 8$	$8 - 6 = -6 + 8$
$4 \cdot (x \cdot y) = (4 \cdot x) \cdot y$	$5 + (x + 2) = (5 + x) + 2$	$a + (b \cdot c) = (b \cdot c) + a$

PROVE $(xy)z = (zy)x$

$(xy)z$

Given

$z(xy)$

$z(yx)$

$(zy)x$

PROVE $x + (y + z) = z + (x + y)$

$x + (y + z)$

Given

$(x + y) + z$

$z + (x + y)$

DISTRIBUTIVE PROPERTY

$-4(2x + 3y)$

Distribute and combine like terms.

	$2h - 4(3h - 7)$	$-4(2x + 3) - 6$
$7d + 2(5 + 3d)$	$8 - 3(2t - 5)$	$\frac{2}{3}(3x + 6) + 12$

PROVE $(3 + x)(2) = 6 + 2x$

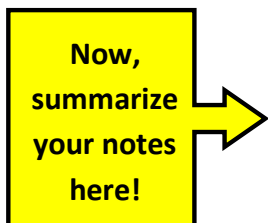
$$(3 + x)(2)$$

Given

$$(2)(3 + x)$$

$$6 + 2x$$

SUMMARY:



1.3 Algebraic Properties

PRACTICE

TRUE/FALSE Circle true or false. If true, circle the property used to determine the expressions equivalent.		
<p>1. $7 + 9 = 9 + 7$</p> <p>TRUE or FALSE</p> <p>If true, equivalent by...</p> <p>Commutative Property</p> <p>Associative Property</p> <p>Distributive Property</p>	<p>2. $(8 \cdot 3)4 = 8(3 \cdot 4)$</p> <p>TRUE or FALSE</p> <p>If true, equivalent by...</p> <p>Commutative Property</p> <p>Associative Property</p> <p>Distributive Property</p>	<p>3. $a + (9 + b) = (a + 9) + b$</p> <p>TRUE or FALSE</p> <p>If true, equivalent by...</p> <p>Commutative Property</p> <p>Associative Property</p> <p>Distributive Property</p>
<p>4. $x - 8 = 8 - x$</p> <p>TRUE or FALSE</p> <p>If true, equivalent by...</p> <p>Commutative Property</p> <p>Associative Property</p> <p>Distributive Property</p>	<p>5. $ac + dc = dc + ac$</p> <p>TRUE or FALSE</p> <p>If true, equivalent by...</p> <p>Commutative Property</p> <p>Associative Property</p> <p>Distributive Property</p>	<p>6. $(a + b)^2 = a^2 + b^2$</p> <p>TRUE or FALSE</p> <p>If true, equivalent by...</p> <p>Commutative Property</p> <p>Associative Property</p> <p>Distributive Property</p>

Fill in the reasons for each proof with the correct property used.

<p>7. Prove: $x^2(2y) = (2x^2)y$</p> <p>$x^2(2y)$ Given</p> <p>$(x^2 2)y$ _____</p> <p>$(2x^2)y$ _____</p>	<p>8. Prove: $3(5 - x) = -3x + 15$</p> <p>$3(5 - x)$ Given</p> <p>$15 - 3x$ _____</p> <p>$-3x + 15$ _____</p>
<p>9. Prove: $t + (2 + t) = 2t + 2$</p> <p>$t + (2 + t)$ Given</p> <p>$t + (t + 2)$ _____</p> <p>$(t + t) + 2$ _____</p> <p>$2t + 2$ Combine Like Terms</p>	<p>10. Prove: $2(h + 5) + 4h = 6h + 10$</p> <p>$2(h + 5) + 4h$ Given</p> <p>$2h + 10 + 4h$ _____</p> <p>$2h + 4h + 10$ _____</p> <p>$6h + 10$ Combine Like Terms</p>

Simplify the expression by using the distributive property.

12. $4(x + 3)$	13. $5(m + 5)$	14. $-8(p - 3)$
15. $(2r - 3)(2)$	16. $6.5(v + 1)$	17. $-(3 + x)$
18. $\frac{3}{2}(8m - 4)$	19. $-(6n - 9)$	20. $-\frac{2}{3}(6n - 9)$

Simplify the expression using distributive property and combine like terms.

21. $6 + 2(y + 1)$	22. $2(4a - 1) + a$	23. $6r - 2(r + 4)$
24. $-3(m + 5) - 10$	25. $3 - 8(w - 5)$	26. $\frac{1}{2}(2m + 6) - 10$

Analyze student work.

27. Mr. Bean and Mr. Brust are really, really bad at the distributive property. They both make huge mistakes using the distributive property. Identify their mistakes and show them how to distribute correctly.

BEAN
 $8 + 2(3p + 1)$
 $10(3p + 1)$
 $30p + 10$

BRUST
 $3d - 2(d - 4)$
 $3d - 2d - 8$
 $1d - 8$

1.3 Algebraic Properties

WRAP UP

State the property used below.

1. $a(5 \cdot b) = (a \cdot 5)b$

Simplify

2. $3 + 2(b - 4)$

3. The expression $2m - (8 - 4m) + 5$ is equivalent to which of the following expressions?

A) $6m + 13$

B) $-2m - 3$

C) $6m - 3$

D) $-2m + 13$

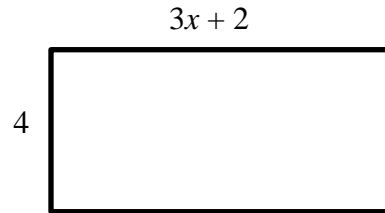
E) none of the above

EXIT TICKET

Tommy is planning to make a tomato garden. The rectangular garden must be 4 foot wide. Tommy doesn't know how long the garden will be, but would like 3 feet per tomato plant plus 1 foot extra at each end of the garden. Tommy doesn't know how many tomato plants he will buy. The diagram below shows the dimensions of the garden for x amount of tomato plants. Create a simplified expression to represent both the area and perimeter of the garden.

Area:

Perimeter:



Now, use your expression to determine both the area and perimeter of the garden if Tommy plants 8 tomato plants.

SMP #4