Taking a Closer Look at Properties

Determine whether the two expressions are equivalent. If so, tell what property is applied. If not, explain why.

1. $15+(5+8)$ and $(15+5)+8$

2. $(20-12)-3$ and $20-(12-3)$

3. $34+0$ and 34

4. $20\div5$ and $5\div20$

5. $3\cdot(6+9)$ and $(3\cdot6)+9$

6. $a+(-a)$ and 0

Your Turn:

7. $10+5+9$ and $5+9+10$

8. $36\div(12\div3)$ and $(36\div12)\div3$

Properties can also be used to write equivalent expressions and to solve problems.

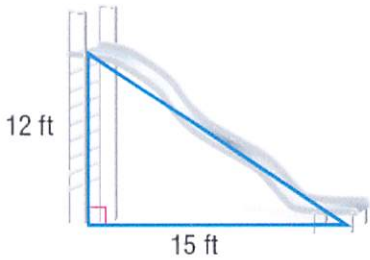
1. In a recent season, the Kansas Jayhawks had 15 guards, 4 forwards, and 3 centers on their roster. Write two equivalent expressions using the Associative Property that can be used to find the total number of players on their roster.

Got It?

2. Brandi earned \$7 babysitting and \$12 cleaning out the garage. Write two equivalent expressions using the Commutative Property that can be used to find the total amount she earned.

Why might the Commutative Property be helpful in this example?

3. The area of a triangle can be found using the expression $\frac{1}{2}bh$, where b is the base and h is the height. Find the area of the area of the triangle shown below.



Put the Expression or Equation in the Appropriate Box

$13+0=13$	$a \cdot 0=0$	$a+(-a)=0$	$100 \cdot 0=0$
$x+t=t+x$	$1x=x$	$0+99=99$	$12 \cdot 1=12$
$4 \cdot \frac{1}{4}=1$	$3+2=2 \cdot 3$	$8 \cdot \frac{1}{8}=1$	$\frac{4}{3}=\frac{3}{4}$
$5+(7+8)=(5+7)+8$	$abc=cba$	$8 \cdot 1=1$	$3x+(-3x)=0$
$a+0=a$	$(6)(4)=(4)(6)$	$-3+3=0$	$2 \cdot (3 \cdot 4)=(2 \cdot 3) \cdot 4$

Additive Identity	**Multiplicative Identity**	**Additive Inverse**	**Multiplicative Inverse**
Zero Property Multiplication	**Commutative Property**	**Associative Property**	**No Property**

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Determine whether the two expressions are equivalent. If so, tell what property is applied. If not, explain why.

1. $15+(5+8)$ and $(15+5)+8$

$15+13$ → 28 and $20+8$ → 28

Yes, Associative Prop. of Addition

2. $(20-12)-3$ and $20-(12-3)$

$8-3$ → 5 and $20-9$ → 11

No, no Associative Prop. of Subtraction

3. $34+0$ and 34

Yes, Identity Prop. of Addition

4. $20\div5$ and $5\div20$

4 and $\frac{1}{4}$

No, no Commutative Prop. of Division

5. $3\cdot(6+9)$ and $(3\cdot6)+9$

$3\cdot15$ → 45 and $18+9$ → 27

No, cant have · and + in same expression with Associative Prop.

6. $a+(-a)$ and 0

Yes, Inverse Prop of Addition

Your Turn:

7. $10+5+9$ and $5+9+10$

$15+9$ → 24 and $14+10$ → 24

Yes, Commutative Prop of Addition

8. $36\div(12\div3)$ and $(36\div12)\div3$

$36\div4$ → 9 and $3\div3$ → 1

No, no Associative Prop of Division

Properties can also be used to write equivalent expressions and to solve problems.

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$(15+4)+3 = 15+(4+3)$

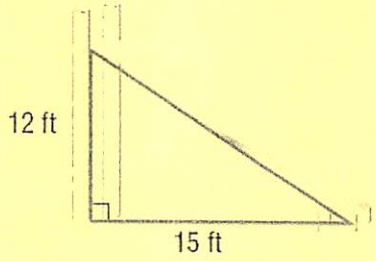
Got It?

2. Brandi earned \$7 babysitting and \$12 cleaning out the garage. Write two equivalent expressions using the Commutative Property that can be used to find the total amount she earned.

$7 + 12$ and $12 + 7$

Why might the Commutative Property be helpful in this example?

3. The area of a triangle can be found using the expression $\frac{1}{2}bh$, where b is the base and h is the height. Find the area of the area of the triangle shown below.



$A = \frac{1}{2}(15)(12)$

$A = \frac{1}{2}(12)(15)$

$A = 6 \cdot 15$

$A = 90 ft^2$

Put the Expression or Equation in the Appropriate Box

$13+0=13$	$a \cdot 0 = 0$	$a+(-a)=0$	$100 \cdot 0 = 0$
$x+t=t+x$	$1x = x$	$0+99=99$	$12 \cdot 1 = 12$
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Additive Identity	**Multiplicative Identity**	**Additive Inverse**	**Multiplicative Inverse**
$13+0=13$ $a+0=a$ $0+99=99$	$1x=x$ $8 \cdot 1 = 1$ $12 \cdot 1 = 12$	$a+(-a)=0$ $-3+3=0$ $3x+(-3x)=0$	$4 \cdot \frac{1}{4}=1$ $8 \cdot \frac{1}{8}=1$
Zero Property Multiplication	**Commutative Property**	**Associative Property**	**No Property**
$a \cdot 0 = 0$ $100 \cdot 0 = 0$	$x+t=t+x$ $abc=cba$ $(6)(4)=(4)(6)$	$5+(7+8)=(5+7)+8$ $2 \cdot (3 \cdot 4)=(2 \cdot 3) \cdot 4$	$3+2=2 \cdot 3$ $\frac{4}{3}=\frac{3}{4}$