Grade 6 Properties of Operations Foldable

Properties of Operations

Identity

Addition

equal to itself

$a + 0 = a$

$4 + 0 = 4$

Multiplication

equal to itself

$a \times 1 = a$

$4 \times 1 = 4$

Commutative

Addition

changing the ORDER of 2 or more addends does NOT change answer

$2 + 3 = 3 + 2$

$5 = 5$

Multiplication

changing the ORDER of 2 or more factors does NOT change answer

$2 \times 3 = 3 \times 2$

$6 = 6$

Associative

Addition

changing the GROUPING of #s in addition problem does NOT change answer

$(2+3)+4 = 2+(3+4)$

$5+4 = 2+7$

$9 = 9$

Multiplication

changing the GROUPING of factors in $\times$ problem does NOT change answer

$(2 \cdot 3) \cdot 4 = 2 \cdot (3 \cdot 4)$

$6 \cdot 4 = 2 \cdot 12$

$24 = 24$

Inverse

Addition

add OPPOSITES to = 0

$4 + (-4) = 0$

$a + (-a) = 0$

Multiplication

multiply a # by its RECIPROCAL (Flip) to = 1

$\frac{3}{4} \rightarrow \frac{4}{3} = \frac{12}{12} = 1$

$\frac{4}{1} \rightarrow \frac{1}{4} = \frac{4}{4} = 1$

Distributive

multiply # on outside of ( ) to every # inside ( ).

$a(b+c) = ab + ac$

$2(x+3)$

$2(x) + 2(3)$

$2x + 6$

$3(x+4)$

$3(x) + 3(4)$

$3x + 12$

1-1 Properties CW

Reflexive Property for any real # a, $a = a$
(mirror image)
ex $4 = 4$

Symmetric Property for any real #s a & b, if $a = b$
(reverse order) then $b = a$ if $x+3 = 7$, then $7 = x+3$
ex if $\frac{2}{5} = .4$, then $.4 = \frac{2}{5}$ or if $.75 = \frac{3}{4}$, then $\frac{3}{4} = .75$

Transitive Property for any real #s a, b, & c, if $a = b$ & $b = c$,
(transfer info) then $a = c$.
ex if $\frac{2}{5} = .4$ & $.4 = 40\%$, then $\frac{2}{5} = 40\%$.

For each problem, identify the property that is represented.

1. $234 + (-234) = 0$

Additive Inverse

2. $-4 \times (3 \times 5) = (-4 \times 3) \times 5$

3. $-24 \times 1 = -24$

multiplicative Identity

4. $-67 \times 56 = 56 \times (-67)$

5. $-456 + 34 = 34 + (-456)$

Additive Commutative

6. $4 \times 0.25 = 1$

7. If $5 = (-1)(-5)$ then $(-1)(-5) = 5$.

Symmetric

8. If $c = 5 \times 7$ and $35 = 70 \div 2$, then $c = 70 \div 2$.

9. $a + (4 + c) = (a + 4) + c$

additive associative

10. $\left(-\frac{3}{4}\right)\left(-\frac{4}{3}\right) = 1$

11. $-2\frac{3}{4} \times 1 = -2\frac{3}{4}$

multiplicative Identity

12. $\left(-\frac{3}{4}\right) + \left(\frac{4}{3} + 5\right) = \left(-\frac{3}{4} + \frac{4}{3}\right) + 5$