

Name KEY

Match each property or identity with the appropriate definition.

1. _____ Multiplicative Inverse - **I**

A. When a value on the left side of a set of parentheses, is multiplied across terms separated by an operation of subtraction

2. _____ Transitive Property - **C**

B. Any number multiplied by zero will produce an answer of zero.

3. _____ Additive Identity - **E**

C. Two valid statements will initially be given, one can then logically arrive at a third valid statement by passing on the shared trait.

4. _____ Distributive Property - **A**
from left over subtraction

D. When the product of a number and one is taken, the result is that the number is unchanged. **MULTIPLICATIVE IDENTITY**

5. _____ Multiplicative Property of Zero - **B**

E. When the sum of a number and zero is taken, the result is that the non-number is unchanged.

6. _____ Associative Property - **F**
for Multiplication

F. When a series of terms are multiplied together one can regroup the terms using parentheses but the end result is left unchanged.

7. _____ Commutative Property - **H**
for Addition

G. Adding opposites produces a result that is the additive identity "0" **ADDITIVE INVERSE**

H. When a series of terms are being added together one can rearrange the terms without effecting the end result.

I. Multiplying reciprocals produces a result that is the multiplicative identity "1"

Match each property or identity with the appropriate example.

1. _____ Reflexive Property - I

A. If $a = b$, and $b = c$,
then $a = c$. **TRANSITIVE**

2. _____ Additive Inverse - K

B. $2(4 + 3) = 2(7)$

3. _____ Substitution Property - B

C. $1 \cdot \left(-\frac{4}{5}\right) = -\frac{4}{5}$

4. _____ Distributive Property - J
from right over addition

D. $(4p - 5)2 = 8p - 10$ **DIST PROP
RIGHT / SUBTRACT**

5. _____ Symmetric Property - L

E. $cd - 7 = dc - 7$

6. _____ Multiplicative Identity - C

F. $(a + b) + c = a + b + c$

7. _____ Commutative Property - E
for Multiplication

G. $5 \cdot 7 \cdot 0 \cdot 3 = 0$

8. _____ Associative Property for Addition - F

H. $ab + 5 + c = 5 + ab + c$

9. _____ Multiplicative Property of Zero - G

I. $11y + 2 = 11y + 2$

10. _____ Commutative Property for Addition - H

J. $(3w + 7)5 = 15w + 35$

K. $-4 + 4 = 0$

L. If $w = 3f - 7$, then $3f - 7 = w$

J. $B \cdot \left(\frac{1}{B}\right) = 1$ **MULTIPLICATIVE INVERSE**

Find the pattern and fill in the blanks

A. 35, 32, 37, 34, 39 36 41 38
 $\begin{array}{ccccccc} \vee & \vee & \vee & \vee & \vee & \vee & \vee \\ -3 & +5 & -3 & +5 & -3 & +5 & -3 \end{array}$

36, 41, 38

B. 2, 8, 6, 9, 36, 34, 37 148 146 149
 $\begin{array}{ccccccc} \vee & \vee & \vee & & \vee & \vee & \vee \\ \times 4 & -2 & +3 & \dots & \times 4 & -2 & +3 \end{array}$

148, 146, 149

Determine if each of the following operations are closed under the given number set.

1. {Odd Integers}; $A^2 + B$

1. NOT CLOSED

Counter example if applicable:

$$3, 7 \Rightarrow \begin{array}{l} 3^2 + 7 \\ 9 + 7 = 16 \end{array}$$

2. {Whole}; $A \cdot (2B + 1)$

2. CLOSED

Counter example if applicable:

$$\begin{array}{l} 3, 5 \Rightarrow 3 \cdot 11 = 33 \\ 5, 3 \Rightarrow 5 \cdot 7 = 35 \end{array} \left. \vphantom{\begin{array}{l} 3, 5 \\ 5, 3 \end{array}} \right\} \text{WHOLE} \cdot \text{WHOLE ALWAYS} = \text{WHOLE}$$

3. {Even Integers}; $(A-3) - (B+1)$

3. CLOSED

Counter example if applicable:

$$\begin{array}{l} 4, -6 \Rightarrow 1 - (-5) = 6 \\ -6, 4 \Rightarrow -9 - 5 = -14 \end{array} \left. \vphantom{\begin{array}{l} 4, -6 \\ -6, 4 \end{array}} \right\} \text{ODD} - \text{ODD ALWAYS} = \text{EVEN}$$

4. {Even Whole}; multiplication

4. CLOSED

Counter example if applicable:

$$\begin{array}{l} 2, 8 \Rightarrow 2 \cdot 8 = 16 \\ 8, 2 \Rightarrow 8 \cdot 2 = 16 \end{array} \quad \text{EVEN} \cdot \text{EVEN ALWAYS} = \text{EVEN}$$

5. {Odd Integers}; $(A-1) + (B+3)$

5. NOT CLOSED

Counter example if applicable:

$$\begin{array}{l} 3, 7 \Rightarrow 2 + 10 = 12 \\ 7, 3 \Rightarrow 6 + 6 = 12 \end{array}$$

Use the Distributive Property to simplify each expression.

6. $5(3x-1) + 2(4x+3)$

6. _____

$$\begin{array}{l} 15x - 5 + 8x + 6 \\ 23x + 1 \end{array}$$

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

7. _____

$$\begin{array}{l} \underline{22m} + 55 - \underline{35m} + 14 - \underline{2m} \\ -15m + 69 \end{array}$$

8. $\frac{2}{7}(14h+28) - \frac{3}{5}(20h+40) + 3h$

8. _____

$$\begin{array}{l} \underline{4h} + 8 - \underline{12h} - 24 + \underline{3h} \\ -5h - 16 \end{array}$$

Order of Operation

1. $5 \left[\frac{1}{2} + \left(\frac{3}{5} \cdot \frac{5}{6} \right) \div \frac{5}{8} \right]$: CANCEL 5's / REDUCE 3 & 6 1. _____

$5 \left[\frac{1}{2} + \frac{1}{2} \cdot \frac{8}{5} \right]$: RECIPROCAL $\frac{5}{8}$, CANCEL 2 & 8

$5 \left[\frac{1}{2} + \frac{4}{5} \right]$: NEED COMMON DENOMINATOR

$5 \left[\frac{5}{10} + \frac{8}{10} \right]$

$\frac{5}{1} \left[\frac{13}{10} \right]$: REDUCE 5 WITH 10

$\frac{13}{2} = 6\frac{1}{2}$

2. $\left(\frac{1}{3} \right)^2 - \left[\frac{1}{3} - \frac{1}{4} \div \frac{5}{6} + \frac{1}{2} \right]$: SQUARE $\frac{1}{3}$, RECIPROCAL $\frac{5}{6}$ 2. _____

$\frac{1}{9} - \left[\frac{1}{3} - \frac{1}{4} \cdot \frac{6}{5} + \frac{1}{2} \right]$: REDUCE 4 AND 6

$\frac{1}{9} - \left[\frac{1}{3} - \frac{3}{10} + \frac{1}{2} \right]$: $\frac{1}{2} \cdot \frac{3}{5} = \frac{3}{10}$

$\frac{1}{9} - \left[\frac{10}{30} - \frac{9}{30} + \frac{15}{30} \right]$: COMMON DENOMINATOR

$\frac{1}{9} - \frac{16}{30} \Rightarrow \frac{1}{9} - \frac{8}{15} \Rightarrow \frac{5}{45} - \frac{24}{45} = \boxed{\frac{-19}{45}}$

Write the Solution Set to each of the following.

3. $x^2 - 3 \geq x$
 $r = \{-4, -1, 1, 4, 10\}$ 3. $\{-4, 4, 10\}$

-4: $13 \geq -4$ ✓ 10: $97 \geq 10$ ✓

-1: $-2 \geq -1$ ✗

1: $-2 \geq 1$ ✗

4: $13 \geq 4$ ✓

4. $x^2 - 14 \geq x$
 $r = \{-4, -1, 1, 4, 10\}$ 4. $\{-4, 10\}$

-4: $2 \geq -4$ ✓ 4: $2 \geq 4$ ✗

-1: $-13 \geq -1$ ✗ 10: $86 \geq 10$ ✓

1: $-13 \geq 1$ ✗

5. $2x + 5 > x^2$
 $r = \{-1, 1, 2, 3, 4, 5, 7\}$ 5. $\{-1, 1, 2, 3\}$

-1: $3 > 1$ ✓

1: $7 > 1$ ✓ 4: $13 > 16$ ✗

2: $9 > 4$ ✓ 5: $15 > 25$ ✗

3: $11 > 9$ ✓ 7: $19 > 49$ ✗

Translate the following but DO NOT SOLVE

Use "x" to represent the number unless otherwise stated

1. The difference of five times a number and seven is the same as three less than thirteen times the number.

$$5x - 7 = 13x - 3$$

1 _____

2. Two subtracted from nine times a number is the same as three more than twice the sum of six times a number and five.

$$9x - 2 = 2(6x + 5) + 3$$

2 _____

3. Four times the sum of twice the cube of a number and seven is four less than nine times the number.

$$4(2x^3 + 7) = 9x - 4$$

3 _____

4. The square of the difference of nine times a number and two is four more than twice the sum of the number and five.

$$(9x - 2)^2 = 2(x + 5) + 4$$

4 _____

5. Ten times the sum of five times a number and three is four less than nine times the number.

$$10(5x + 3) = 9x - 4$$

5 _____

6. Four times the difference of seven and six times the square of a number is two less than five times the cube of the number.

$$4(7 - 6x^2) = 5x^3 - 2$$

6 _____