Variables

They are just numbers.

Get the answer as fast as your can! Ready?

- $3+4 =$
- $4+3 = ?$
- $17 + 97 + 43 = 157$
- $17 + 43 + 97 =$
- $28 \times {}^-56 = {}^-1568$
- ${}^-56 \times 28 =$ **?**
- $7 \times 11 \times 10 =$
- $10 \times 7 \times 11$
- What's the pattern?

Commutative Property

$$a + b = b + a \qquad \text{or} \qquad a \cdot b = b \cdot a$$

If the operation is + or x then you can add in any order.

Get the answer as fast as your can! Ready?

- $0 + .7359 =$
- $4+3 + 0 = ?$
- $.9374872 + 0=$
- $487963 \times \mathbf{1} = {}^{-}56 \times 28 = \mathbf{?}$
- $1 \times 11 \times 1 =$
- $1 \times 7 + 0$
- What's the pattern?

Identity. Does not "change number"

0 for Addition (+)

1   for   Multiplication (x)

Get the answer as fast as your can! Ready?

- $^-7 + 7 = 7 + ^-7 =$
- $50 + ^-50 = ?$
- $60 + \quad = 0$
- $\quad + \pi = 0$
- $^-59 + \quad = 0$
- $\pi + ^-\pi =$
- What's the pattern?

Inverse Makes the identity. Opposite for addition.   What about Multiplication?

- *What is* $\frac{13}{13} = \frac{5}{5} = \frac{6}{6} = \frac{3}{3} = \frac{N}{N}$
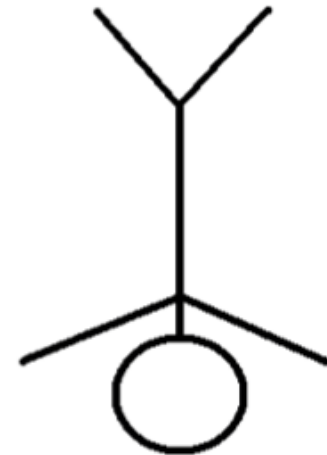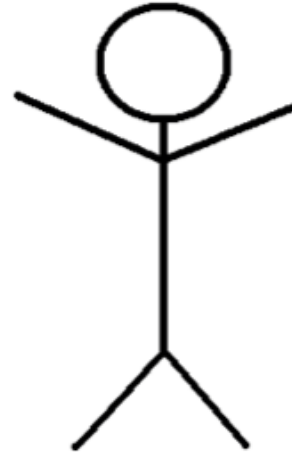
- $\frac{4}{1} \times \frac{1}{4} = \frac{4}{4} = 1$

- $\frac{2}{3} \times \frac{3}{2} = \frac{6}{6} = 1$

- $\frac{7}{1} \times \frac{?}{?} = 1$

- See a pattern?

- Multiplicative Inverse

Associative. a + (b + c)= (a + b) + c

- 2 + 3+ 7 = (2+3) + 7 = 2+ (3+7)
- 2 $*$ 3 $*$ 5 =(2 $*$ 3) $*$ 5 = 2 $*$ (3 $*$ 5)
- Note All multiplication or All addition you can drop parenthesis.
- (17.397 + 9) + $^-$9 = ???????

Why only ten's

- 5 x 10 = 50
- 5 x 3 = 15
- 5 x 13 =

- 7 x 10 = 70
- 7 x 3 = 21
- 7 x 13 =

- 4 x 10 =
- 4 x 4 =
- 4 x 14 =

- 9 x 100 =
- 9 x 1 =
- 9 x 99 =

Distributive Property

- $2(10 + 7) = 2(10) + 2(7) = 20 + 14$
- $7(29) = 7(20 + 9) =$
- $5(\Delta + \oslash) = 5\Delta + 5\oslash$

- What is $(9 * 6) + (9 * 5) = 9(??)$
- What is $6(17) = \_\_\_\_\_ + _____$

Important Ideas

- Subtraction is the same as adding the opposite
- Division is the same as multiplying by multiplicative inverse.

Look Back

- https://www.khanacademy.org/coach/class/5757334940811264/assignments

- https://www.khanacademy.org/math/algebra/introduction-to-algebra/alg1-dependent-independent/e/create-two-variable-equations-from-real-world-contexts

- https://www.khanacademy.org/math/algebra/introduction-to-algebra/alg1-dependent-independent/e/match-equations-to-coordinates-on-a-line

MAIN IDEA

Additive Property of Equivalency

If x = y then x + a = y + a

If you add the same number to both sides of the = then the equation is equivalent (has the same answer)

Multiplicative Property of Equivalency

If x = y then for all a≠0 then a ∗ b = a ∗ y

If you multiply the same number except 0 to both sides of then = then the equation is equivalent (has the same answer)