Properties

1-6

Commutative Properties of Addition and Multiplication

Addition

The order in which numbers are added does not change the sum.

$$4 + 7 = 7 + 4$$

For any number *a* and *b*,

$$a + b = b + a$$

Multiplication

The order in which numbers are multiplied does not change the product.

$$6 \cdot 4 = 4 \cdot 6$$

For any numbers a and b,

$$a \cdot b = b \cdot a$$

Associative Properties of Addition and Multiplication

Addition

The way in which addends are grouped does not change the sum.

$(4 + 3) + 5 = 4 + (3 + 5)$

For any numbers a, b, and c.

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

Multiplication

The way in which factors are grouped does not change the product.

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

For any number a, b, and c.

$(a \cdot b) \cdot c = a \cdot (b \cdot c)$

Identity Properties of Addition and Multiplication

Addition

The sum of an number and zero is the original number.

$$5 + 0 = 5$$

For any number *a*,

$$a + 0 = a$$

Multiplication

The product of a factor and one is the factor.

$$7 \cdot 1 = 7$$

For any number a,

$$a \cdot 1 = a$$

Multiplicative Property of Zero

The product of a factor and zero is zero.

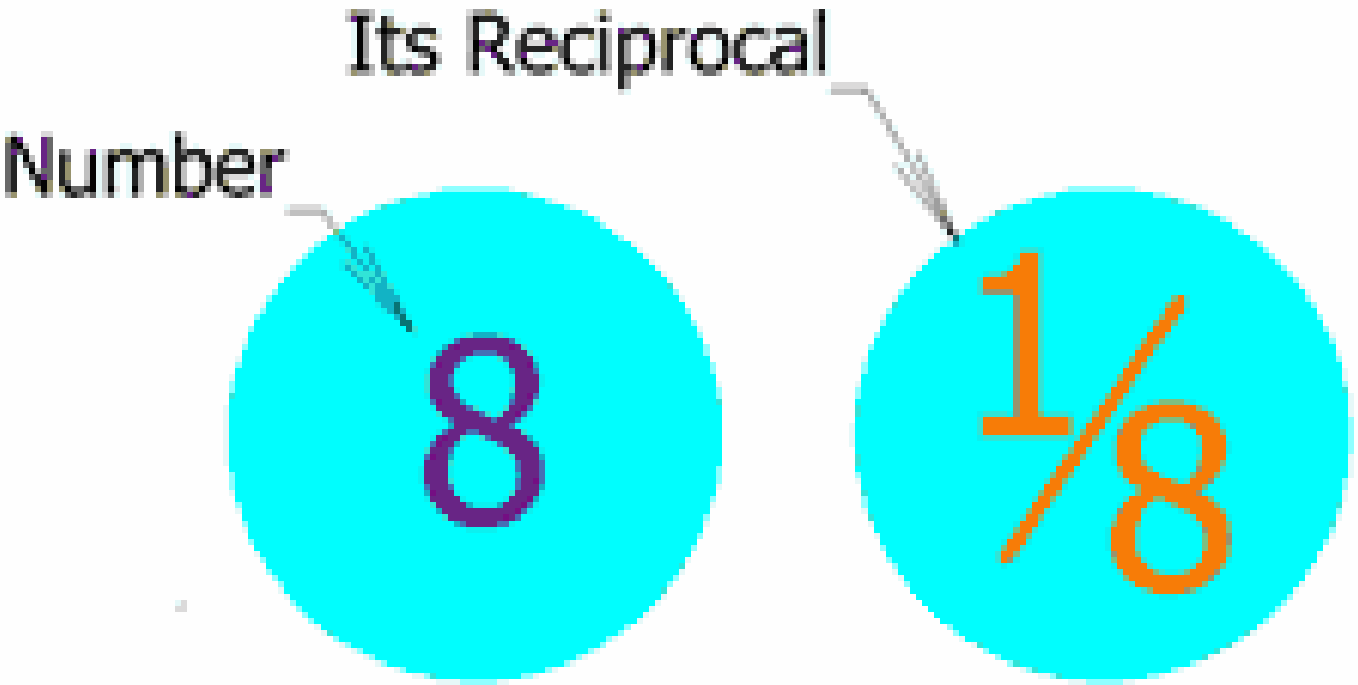
$$2 \cdot 0 = 0$$

For any number a,

$$a \cdot 0 = 0$$

Reciprocal = **Flip it!!!!**

- **Reciprocal**
- *If you have a number, the reciprocal is 1 / number*
- *If it's a fraction, flip the fraction*



Reciprocal

Find the reciprocal of $\frac{3}{4}$.

$\frac{3}{4}$ and $\frac{4}{3}$ are reciprocals since

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

Reciprocal

Solution: $\frac{110}{7}$ and $\frac{7}{110}$ are reciprocals since

$$\frac{110}{7} \times \frac{7}{110} = 1$$

Distributive property

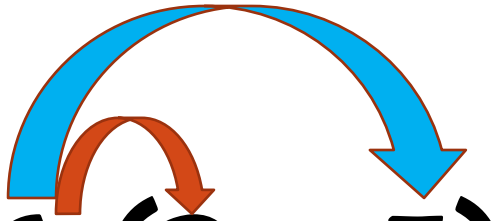
Click for video

Distributive Property

$6\ (2 + 5)$

$6(7)$

42



$6\ (2 + 5)$

$6(2) + 6(5)$

$12 + 30$

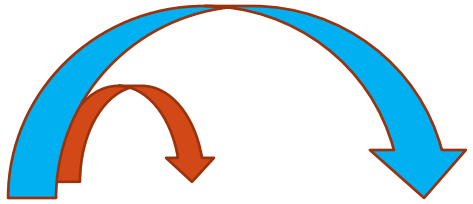
42

Distributive Property

5 (3 + 4)

5(7)

35



5 (3 + 4)

5(3) + 5(4)

15 + 20

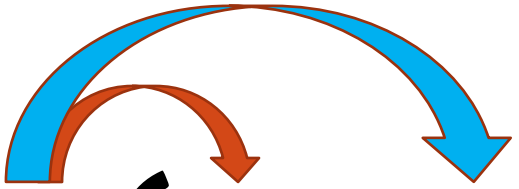
35

Distributive Property

$2\,(10 + 3)$

$2(13)$

26



$2\,(10 + 3)$

$2(10) + 2(3)$

$20 + 6$

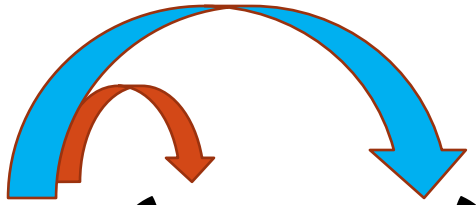
26

Distributive Property

$6\ (2 + 5)$

$6(7)$

52



$6\ (2 + 5)$

$6(2) + 6(5)$

$12 + 30$

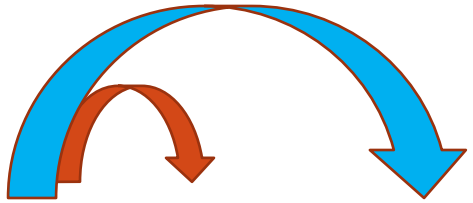
52

Distributive Property

$4\ (2 + 3)$

$4(5)$

20



$4\ (2 + 3)$

$4(2) + 4(3)$

$8 + 12$

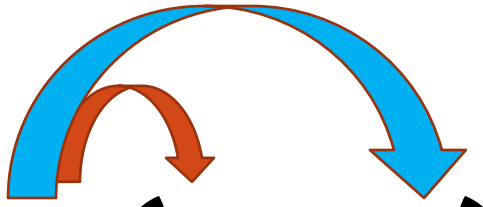
20

Distributive Property

$a\,(3 + 5)$

$a(8)$

$8a$



$a\,(3 + 5)$

$a(3) + a(5)$

$3a + 5a$

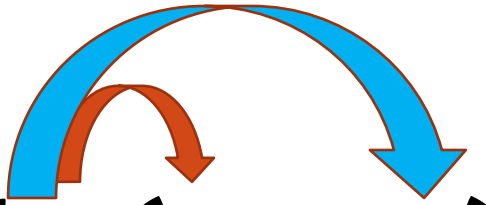
$8a$

Distributive Property

b (4 + 2)

b(6)

6b



b (4 + 2)

b(4) + b(2)

4b + 2b

6b

Distributive Property –

- Multiply numbers by breaking apart one of the numbers and writing it as a sum or difference.

1. $8\,(14) = 8\,(20 - 6) = 8 \cdot 20 - 8 \cdot 6 = 160 - 48 = 112$
2. $6\,(23) = 6\,(20 + 3) = 6 \cdot 20 + 6 \cdot 3 = 120 + 18 = 138$

3. In algebra – we multiply the **a** times both things in the parenthesis.
4. $a \cdot (b + c) = a \cdot b + a \cdot = ab + ac$
5. $2\,(a + b) = 2 \cdot a + 2 \cdot b = 2a + 2b$

Name the Property

1) $14 + 5 + 16 = 16 + 5 + 14$

Commutative Property of Addition

2) $25 \cdot 9 \cdot 4 = 4 \cdot 25 \cdot 9$

Commutative Property of Multiplication

3) $(y + 2) + 3 = y + (2 + 3)$

Associative Property of Addition

1) $4(5m) = (4 \cdot 5)m$

Associative Property of Multiplication

1) $3 \cdot 5 \cdot 0 = 0$

Multiplicative Property of Zero

1) $z \cdot 1 = z$

Identity Property of Multiplication