Table 3. The properties of operations. Here a, b and c stand for arbitrary numbers in a given number system. The properties of operations apply to the rational number system, the real number system, and the complex number system.

```
(a + b) + c = a + (b + c)
                      Associative property of addition
                                                                                          a + b = b + a
                    Commutative property of addition
                        Additive identity property of O
                                                                                        a + 0 = 0 + a = a
                         Existence of additive inverses
                                                                 For every a there exists -a so that a + (-a) = (-a) + a = 0.
                Associative property of multiplication
                                                                                     (a \times b) \times c = a \times (b \times c)
                                                                                          a \times b = b \times a
              Commutative property of multiplication
                   Multiplicative identity property of 1
                                                                                         a \times 1 = 1 \times a = a
                                                                For every a \neq 0 there exists 1/a so that a \times 1/a = 1/a \times a = 1.
                   Existence of multiplicative inverses
Distributive property of multiplication over addition
                                                                                   a \times (b + c) = a \times b + a \times c
```

Table 4. The properties of equality. Here a, b and c stand for arbitrary numbers in the rational, real, or complex number systems.

```
Reflexive property of equality
                                                                       a = a
  Symmetric property of equality
                                                               If a = b, then b = a.
    Transitive property of equality
                                                         If a = b and b = c, then a = c.
     Addition property of equality
                                                           If a = b, then a + c = b + c.
                                                           If a = b, then a - c = b - c.
 Subtraction property of equality
                                                           If a = b, then a \times c = b \times c.
Multiplication property of equality
                                                      If a = b and c \neq 0, then a \div c = b \div c.
      Division property of equality
 Substitution property of equality
                                                   If a = b, then b may be substituted for a
                                                        in any expression containing a.
```

Table 5. The properties of inequality. Here a, b and c stand for arbitrary numbers in the rational or real number systems.

```
Exactly one of the following is true: a < b, a = b, a > b.

If a > b and b > c then a > c.

If a > b, then b < a.

If a > b, then -a < -b.

If a > b, then a \pm c > b \pm c.

If a > b and c > 0, then a \times c > b \times c.

If a > b and c < 0, then a \times c < b \times c.

If a > b and c < 0, then a \times c < b \times c.

If a > b and c < 0, then a \times c < b \times c.

If a > b and c < 0, then a \times c < b \times c.
```