1.1 Basic operations on numbers

There are four basic operations on numbers.

$$(+) \text{ Addition, } (-) \text{ Subtraction, } (\cdot), (\times) \text{ Multiplication, } (:), (\div) \text{ Division}$$

1. Addition
   The **plus sign** $(+)$ indicates addition and it is used when combining two numbers.

   Example. When adding 123 and 321 you must remember that the number 123 is the **addend** or **summand** number 321 is the second addend or summand. The result of addition is called the **sum**, and in our example is equal to 444.

   $$123 + 321 = 444$$

2. Subtraction
   The **minus sign** $(-)$ is related to subtraction of two (or more) numbers.

   Example. When we **take away** 120 from 430 we get 310. The number 430 is called the **minuend**, the number 120 is the **subtrahend** and the result of subtraction, the number 310, is called the **difference**.

   $$430 - 120 = 310$$

3. Multiplication
   Multiplication, signified by the multiplication sign – $(\cdot)$, or more common in western notation by a sign $(\times)$, is the operation of adding a group of objects, elements with the same properties a certain number of times.

   Example. If we take a collection of 12 objects and we multiply them by 6, we have 72 objects.

   $$12 \cdot 6 = 72$$

   Number 12 is called the **multiplicand**, The number 6 is the **multiplier**. The result of multiplication is called a **product**. Multiplicand and multiplier are also called **factors**.

4. Division
   Division signified by the division sign (: or $\div$) is understood as a method of distribution a group of objects into equal parts.

   Example. If we want to divide 72 apples into 6 equal groups we have 12 apples in each group.

   $$72 : 6 = 12$$

   In this case mumber 72 is called the **dividend**, The number 6 is the **divisor**. The result of division is called a **quotient**.

5. The Basic Arithmetic Properties

(a) **Commutative Property** - The commutative property describes equations in which the order of the numbers involved does not affect the result. Addition and multiplication are commutative operations:

$123 + 324 = 324 + 123$
$24 \times 44 = 44 \times 24$

Subtraction and division, however, are not commutative.

(b) **Assosiative Property** - The associative property describes equations in which the grouping of the numbers involved does not affect the result. As with the commutative property, addition and multiplication are associative operations:

$13 + (34 + 21) = (13 + 34) + 21$
$(14 \times 4) \times 10 = 14 \times (4 \times 10)$

Once again, subtraction and division are not associative.

(c) **Distributive Property** - The distributive property can be used when the sum of two quantities is then multiplied by a third quantity.

$(2 + 4) \times 3 = 2 \times 3 + 4 \times 3 = 18$

6. Negative numbers - Operations on negative numbers

- The addition of two negative numbers results in a negative; the addition of a positive and negative number produces a number that has the same sign as the number of larger magnitude.
- Subtraction of a positive number yields the same result as the addition of a negative number of equal magnitude, while subtracting a negative number yields the same result as adding a positive number.
- The product of one positive number and one negative number is negative, and the product of two negative numbers is positive.
- The quotient of one positive number and one negative number is negative, and the quotient of two negative numbers is positive.

EXERCISES

1. Write down full sentences ((a) *is made as an example*)

   (a) $62 + 82 = 144$

   Sixty-two plus eighty-two is equal to one hundred and fourty-four.

   (b) $142 - 33 = 109$

   (c) $13 \cdot 7 = 91$

   (d) $198 : 18 = 11$

   (e) $453 + 224 = 677$

   (f) $1231 - 546 = 685$

   (g) $72 \cdot 14 = 1008$

   (h) $5425 : 25 = 217$

2. Write down the correct number. ((a) *is made as an example*)

   (a) Quotient of 642 divided by 6 — **107**
   (b) Difference between 642 and 579
   (c) Sum of 423 and 217
   (d) Product of 176 and 19
   (e) 125 divided by 5
   (f) This number has factors 217 and 8
   (g) Dividend if divisor is 3 and quotient is 513
   (h) Subtract 2 from 230
   (i) Multiply 375 by 5
   (j) Dividend if divisor is 5 and quotient is 724