# Math 2 Classwork 26

## Warm Up

**1** **Multiplication table.** Solve as many as you can in **3 minutes.**

Independent work

Compare:

20 × 10 … 200 × 1

80 × 11 … 8(5 + 6)

6 × 44 … 6 × (22 + 22)

(25 + 25) × 300 … 50 × 30

20 × 25 – 10 × 25 … 10 × 25

200 × 11 … 220 × 10

6 × 70 … 6(35 + 35)

120 × 60 … (60 + 60) × 60

700 × 8 …70 × 800

30 × 100 – 15 × 100 … 2 × 100

**2** Collect the like items to simplify:

5a + 6a = ______________

25 + a + b =_____________

3 + 2x + 4 – x = _______________

41 + 10a – 25 – 10x + 7a =_______________________

**3** Without calculations, write all expressions in the descending order (from the largest to smallest):

30 ÷ 1, 30÷ 5, 30 ÷3, 30 ÷ 10, 30 ÷ 6, 30 ÷ 2, 30 ÷30

_________________________________________________________________

## Homework Review

**4** Daniel has a few boxes with pencils. In each box there are either 3 or 5 pencils.
All boxes are closed, and he cannot open them. Answer each question by writing the expression how he can do it.

a) Can he take exactly 29 pencils without opening any boxes? If he can - how?

_________________________________________________________

b) Can he take 14 pencils without opening any boxes? If he can - how?

_________________________________________________________

c) Can he take 31 pencils without opening any boxes? If he can - how?

_________________________________________________________

**5** The rope of 15 meters long was cut into 3 equal parts. How many parts of the same length can we get if we have a rope of 40 meters long? Show your work.

_________________________________________________________________

# New Material I

**Properties of division:**

**1. Dividing a number by one (Identity property):**

When any number is divided by 1, the quotient is the number itself.

*For Example:* $7 \div 1 = 7$  $53 \div 1 = 53$

$$\mathbf{a \div 1 = a}$$

2. **Dividing a number by itself:**

When a number (except 0) is divided by itself, the quotient is 1.

*For Example:* $7 \div 7 = 1$  $53 \div 53 = 1$

$$\mathbf{a \div a = 1}$$

**6** Calculate:

| | | | |
|---|---|---|---|
| $7 \times 1 =$ ___ | $7 \div 7 =$ ___ | $5 \times 1 =$ ___ | $5 \div 5 =$ ___ |
| $9 \times 1 =$ ___ | $9 \div 9 =$ ___ | $\boldsymbol{a} \times 1 =$ ___ | $\boldsymbol{a} \div \boldsymbol{a} =$ ___ |
| $7 \times 1 =$ ___ | $7 \div 1 =$ ___ | $5 \times 1 =$ ___ | $5 \div 1 =$ ___ |
| $9 \times 1 =$ ___ | $9 \div 1 =$ ___ | $\boldsymbol{a} \times 1 =$ ___ | $\boldsymbol{a} \div 1 =$ ___ |

**Properties of division:**

**3. The zero property of division have two rules.**

Rule1- If you divide zero by any number the answer will be zero. You have nothing to divide.

When 0 is divided by any number, we always get 0 as the quotient.

*For Example:* $0 \div 953 = 0$  $0 \div 5759 = 0$  $0 \div 46357 = 0$

$$\boldsymbol{0 \div a = 0}$$

Rule 2- If any number is divide be zero, then the problem cannot be solved. You cannot divide by nothing.

**Properties of division:**

**4. Multiplication and Division as Inverse operations:**

Two extremely important observations:

**The inverse of multiplication is division**. If we start with a number $\boldsymbol{x}$ and multiply by a number **a**, then dividing the result by the number **a** returns us to the original number $\boldsymbol{x}$. In symbols,

$$\boldsymbol{x \times a \div a = x.}$$

**The inverse of division is multiplication**. If we start with a number $x$ and divide by a number $a$, then multiplying the result by the number a returns us to the original number $x$. In symbols,

$$\boldsymbol{x \div a \times a = x.}$$

*For Example:* $x \times 5 \div 5 = x$  $x \div 7 \times 7 = x.$

**7**

Calculate using the correct order of operations.

$20 \div 4 - 9 \div 9 + 4 \times 8 \div 8 =$ ______________________________

$10 + 40 \div 5 \div 2 \times 5 =$ ______________________________

$6 \times 8 \div 8 - 35 \div 5 + 1 \times 7 =$ ______________________________

$4(8 + 5) - 20 =$ ______________________________

## REVIEW I

Equations with Addition, Subtraction and Multiplication.

*1. Addition:* $x + a = b$ *Solution:* $x + a - a = b - a$ $x = b - a$

*2. Subtractions:* $x - a = b$ *Solution:* $x - a + a = b + a$ $x = b + a$

*3. Multiplication:* $a \times x = b$ *Solution:* $ax \div a = b \div a$* $x = b \div a$

**Dividing both sides of an equation by the same quantity does not change the solution set. That is, if*

$$a = b$$

*then dividing both sides of the equation by c produces the equivalent equation*

$$ac = bc, \qquad \text{provided } c \neq 0.$$

**8**

Solve the equations:

$25 + x = 49$ $y - 251 = 301$ $35 + z = 126$

## New Material II

**Equations with division.**

$x \div a = b$ *Solution:* $x \div a \times a = b \times a$* $x = b \times a = ab$

*Example:* $x \div 6 = 2$ $x \div 6 \times 6 = 2 \times 6$ $x = 12$

**Multiplying both sides of an equation by the same quantity does not change the solution set.*

*That is, if* $a = b$

*then multiplying both sides of the equation by* ***c*** *produces the equivalent equation*

$a \times c = b \times c,$ *provided* $c \neq 0$.

## Properties of division. Equation with division.

**9** Solve the equations:

$4 \times x = 32$ $y \times 8 = 56$ $9 \times z = 72$

48 ÷ x = 8 63 ÷ y = 7 z ÷ 9 = 45

**10** A college bookshop buys pads of legal paper in bulk to sell to students in the law department at a cheap rate.

a) Each pack of paper contains 20 pads. If the shop wants 160 pads for the term, how many packs should be ordered? ________________________

b) If each pack costs $25.00, how much money will these packs cost? ____________________

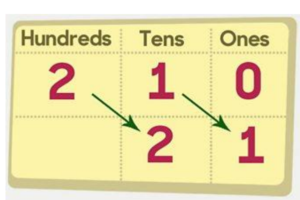
### Division by 10, 100, 1,000, etc.

When you divide a number by 10, the value of each of its digits decreases ten times. Hence, the value of the whole number decreases ten times.

*Example: 460 ÷ 10 = 46 tens ÷ 10 = 46*

When you divide a number by 100, the value of each of its digits decreases hundred times. Hence, the value of the whole number decreases hundred times.

*Example: 4600 ÷ 100 = 46 hundreds ÷ 100 = 46*




210 ÷ 10 = 21

**11** Calculate:

40 ÷ 10 = 560 ÷ 10 = 3300 ÷ 10 = 7800 ÷ 10 =

5800 ÷ 100 = 2100 ÷ 100 = 3300 ÷ 100 = 7800 ÷ 100 =

## Did you know …

Mathematicians almost never use the ÷ symbol for division. Instead, they use fraction notation. The writing of a fraction is really another way to write division. So, 12 ÷ 4 is equivalent to writing $\frac{12}{4}$, where the numerator, 12, is the dividend and the denominator, 4, is the divisor. The line is called a **vinculum,** which is a Latin word meaning **‘bond or link’**.

Just as the history of number is really all about the development of numerals, the history of multiplication and division is mainly the history of the processes people have used to perform calculations. The development of the Hindu-Arabic place-value notation enabled the implementation of efficient algorithms for arithmetic and was probably the main reason for the popularity and fast adoption of the notation.

The earliest recorded example of a division implemented algorithmically is a Sunzi division dating from 400AD in China. Essentially the same process reappeared in the book of al Kwarizmi in 825AD and the modern-day equivalent is known as Galley division. It is, in essence, equivalent to modern-day long division.