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 … $6 \times (22 + 22)$

$(25 + 25) \times 300$ … 50×30

$20 \times 25 - 10 \times 25$ … 10×25

200×11 … 220×10

6×70 … $6(35 + 35)$

120×60 … $(60 + 60) \times 60$

700×8 … 70×800

$30 \times 100 - 15 \times 100$ … 2×100

2

Collect the like items to simplify:

$5a + 6a =$ ______________

$25a + a + 10b + b =$_____________

$3 + 2x + 4 - x =$ _______________

$41 + 10a - 25 - 10x + 7a =$________________________

3

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

$30 \div 1$, $30 \div 5$, $30 \div 3$, $30 \div 10$, $30 \div 6$, $30 \div 2$, $30 \div 30$

____

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:

$7 \times 1 =$ ___	$7 \div 7 =$ ___	$5 \times 1 =$ ___	$5 \div 5 =$ ___
$9 \times 1 =$ ___	$9 \div 9 =$ ___	$a \times 1 =$ ___	$a \div a =$ ___
$7 \times 1 =$ ___	$7 \div 1 =$ ___	$5 \times 1 =$ ___	$5 \div 1 =$ ___
$9 \times 1 =$ ___	$9 \div 1 =$ ___	$a \times 1 =$ ___	$a \div 1 =$ ___

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: $0 \div 953 = 0$ $0 \div 5759 = 0$ $0 \div 46357 = 0$

$$0 \div a = 0$$

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 x and multiply by a number **a**, then dividing the result by the number **a** returns us to the original number x. In symbols,

$$x \times a \div a = x.$$

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,

$$x \div a \times a = x.$$

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

7 Calculate using the correct order of operations.

20 ÷ 4 – 9 ÷ 9 + 4 × 8 ÷ 8 = ____

10 + 40 ÷ 5 ÷ 2 × 5 = ____

6 × 8 ÷ 8 – 35 ÷ 5 + 1 × 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

$ac = bc$, *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 number or symbol does not change the answer.*

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* $c \neq 0$.

9 Solve the equations:

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

$48 \div x = 8$ $63 \div y = 7$ $z \div 9 = 45$

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? ____________________

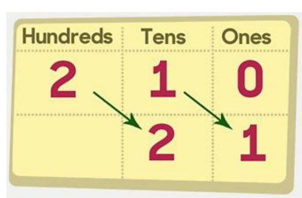
Division by 10, 100, 1,000, etc.

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 …

History of Math symbols.

The first use of plus (+) & minus (-) math symbols dates back to the 14th century. While the multiplication (x) & division (/) operators were invented in the 16th century.
Let's take a look at how symbols for the four basic math operations (addition, subtraction, multiplication and division) came into being, but first, the "equals to" symbol!

Robert Recorde, a Welsh physician, and mathematician invented the "equals to" symbol (=). He introduced the = symbol in his book "*The Whetstone of Witte*" in 1557.

The symbols + and – are universally employed for addition and subtraction operations, respectively. The terms plus and minus come from the Latin language, not English. The Latin translation for Plus is "more", while Minus translates to "less". But what about the symbols? Where did they come from?

The origins of + and – can be traced back to the 14th and 15th centuries. The + symbol is derived from the Latin word "Et" meaning "And". Nicole Oresme, a French philosopher used the symbol + as a shorthand version of Et in his work, the *Algorismus Proportionum.* That being said, the + sign wasn't the universally accepted notation for addition during the 14th century.

The multiplication symbol (×) is often mistaken as the lowercase of the English letter X… but it isn't! The symbol is actually called the cross of San Andreas. The symbol saw its first use in Math in the 16th century. We credit William Oughtred, an English mathematician, for first using the cross of San Andreas to represent the multiplication of two numbers.

Just like the other 3 symbols, the division symbol has had multiple variants over the years, the most popular being the Obelus (÷) and the solidus or fraction bar (/). Yes, they aren't just called the division signs… they have proper names too!

The word Obelus is an ancient Greek word meaning sharpened stick, and the symbol ÷ supposedly represents a small dagger. The Obelus was first used by Swiss mathematician Johann Rahn in his algebra book titled *Teutsche Algebra* in 1659. The solidus or the fraction bar (/) for division was introduced by De Morgan in 1845.

In an attempt to maintain division in the same line, Gottfried Leibniz introduced the colon (:) to represent division and ratios.
Thus, to avoid repeating themselves and save precious time, mathematicians developed universally recognizable symbols. Most math symbols originally invented during the 14th and 15th centuries are now globally used notations. However, the obelus (÷) is no longer widely recognized as a symbol for division. The ISO now only allows the solidus or fraction bar (/) for division and the colon (:) to indicate ratios. Still, if you are nostalgic for the ÷, hold 'alt' on your keyboard and press the numbers 2 4 6 on the number pad. Bet you didn't know about that life hack, but you do now, along with how the most commonly used math symbols (+ – × ÷) came into existence!