Unit 16

Name: _____   **Lesson 16.1**   **Grade 5A**

Date: _____   **The laws of arithmetic**   **Study sheet**

- **Objective(s)**:

1. Use the laws of arithmetic to simplify calculations.

2. Understand the order of operations and use brackets to change the order of operations.

Commutative Property

Addition	Multiplication
You can add in any order.	You can multiply in any order.
$a + b = b + a$	$a \times b = b \times a$
$3 + 5 = 5 + 3$	$2 \times 6 = 6 \times 2$

Associative Property Formula

For Addition

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

For Multiplication

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

Distributive Property: It's when you break a number to easy numbers for multiplication by a number given.

The rules for order of operations:
1. Work out the answer in **brackets** first.

2. **Multiply** and **divide** from left to right.

3. **Add** and **subtract** from left to right.

Use the order of operations to fill in the blanks.

a) 5 × 24 × 6 – 10

= 24 × ……… × ………. – 10   Use the **commutative law** of multiplication.

= 24 × …………. – 10   Use the **associative law** of multiplication.

= …………... – 10   Do **multiplication** before **subtraction.**

= ………

b) 21 + 15 + 3 × 3

= 21 + 15 + ………...   Do **multiplication** before **addition**.

= 21 + …………. + 15   Use the **commutative law** of addition.

= ……… + ………

= ………

c) 500 + 28 × 14

= 500 + 28 × …………. + 28 × 4   Use the **distributive law**.

= 500 + …………. + …………   Do **multiplication** before **addition**.

= …………...

Use the **law of arithmetic** to solve the following equations.

a) $20 + 2 \times 26 \times 5 \ =$

b) $17 \times 15 - 50 =$

c) $120 \times 11 - 1300 =$

d) $182 - 5 \ \times 7 \times 4 =$

Draw a ring around the letters of the expressions that give the same answer.
Show your work.

a) $3 \times (25 + 15) + 30$

b) $(90 - 18) + 13 \times 6$

c) $210 - \ 120 \div 6$

d) $7 \times 6 \ - 2 \times 14$

David has 46 red pens and 34 blue pens.
He puts all the pens equally into 4 drawers.
How many pens are there in each drawer?

....

Insert brackets to make each statement true.

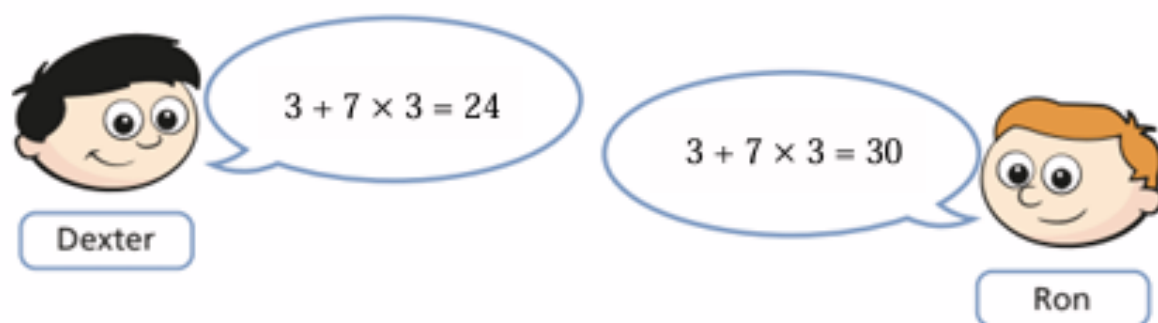a) $5 + 5 \times 7 + 4 = 60$　　　　　　　　b) $70 - 30 \div 5 + 7 = 15$

c) $10 \times 9 + 18 - 3 \times 2 = 120$

Tia works at a restaurant. She earns $14 every hour.
She works on **weekdays** for 8 hours a day.
After working for 20 weeks, she will receive an additional payment of $270.
How much will she earn in 20 weeks?

$...........

4

Dexter and Ron are completing the same calculation.

$3 + 7 \times 3 = 24$

Dexter

$3 + 7 \times 3 = 30$

Ron

Who is correct? ....

Explain your answer.

....

....

Rita goes shopping with £20.
She spends £4 on a book and buys 5 magazines each costing £3.
Tick the calculations that show how much money she has left in pounds.

$20 - 4 + 5 \times 3$	$20 - (4 + 5) \times 3$	$20 - (4 + 5 \times 3)$
$20 - 4 - 5 \times 3$	$20 - 5 \times 3 + 4$	$20 - (5 \times 3 + 4)$

Use the of the order of operations rule to determine which of the following expressions is equal to 1.

a) $2 + 2 \div 2 \times 2$

b) $2 + (2 \div 2) \times 2$

c) $(2 + 2) \div 2 \times 2$

d) $(2 + 2) \div (2 \times 2)$

Fill in each box with the correct operation to make this statement true.

a) $18 \boxed{}\ 2 \boxed{}\ 2 = 11$

b) $(20 \boxed{}\ 4) \boxed{}\ 8 = 3$

Show that $34 + [(8 \times (100 \div 10) - 6] = 108$

Complete these calculations by filling in the missing number.

1. $4 \times \boxed{} - 25 = 23$ 4. $(5 + 9) \div \boxed{} = 2$

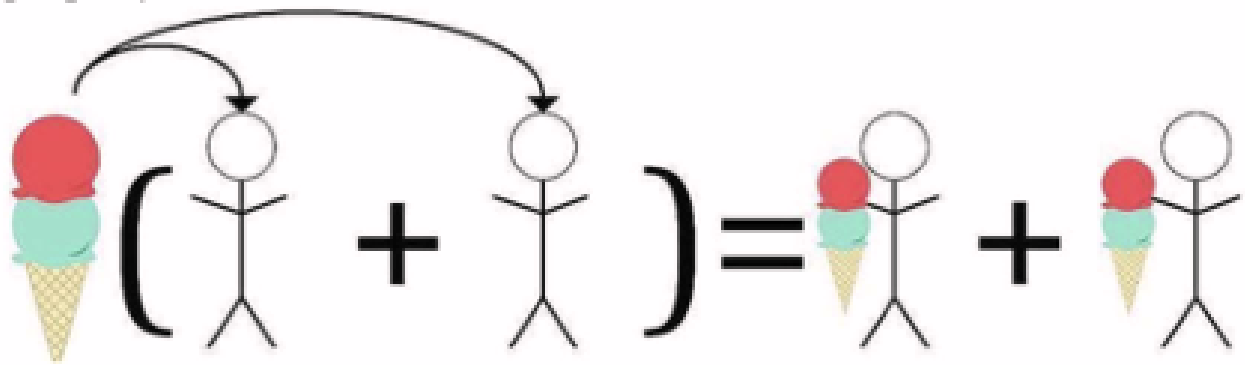2. $(26 - 10) \div \boxed{} = 4$ 5. $9 \times (12 - \boxed{}) = 63$

Put brackets in the following to make the answers correct.

1. $6 \times 7 - 4 \times 8 = 10$

2. $8 \times 9 - 5 - 6 = 26$

Mikel thinks of a number. He multiplies the number by 100, divides it by eight then adds 6.50 . The answer is 1206.5 .
What was his starting number?

Fill in the blanks to solve each problem below using the distributive property.

1. 8 x 9

   8 x (3 + 6)

   (8 x ____) + (8 x ____)

   ____ + ____

   8 x 9 = ____

2. 12 x 3

   (____ + 2) x 3

   (____ x 3) + (2 x 3)

   ____ + ____

   12 x 3 = ____

3. 4 x 13

   4 x (____ + ____)

   (4 x ____) + (4 x ____)

   ____ + ____

   4 x 13 = ____

4. 14 x 6

   (____ + ____) x 6

   (____ x 6) + (____ x 6)

   ____ + ____

   14 x 6 = ____

Write in the missing numbers.

a. $15 \times 12 = \boxed{} \times 3 \times 15$

b. $15 \times 12 = 5 \times 4 \times \boxed{} \times 3$