

# ST. AGNES JUNIOR SCHOOL

## P.7 MATHEMATICS

### LESSON ONE

#### TOPIC: NUMERATION SYSTEM AND PLACE VALUES.

#### SUBTOPIC: MULTIPLICATION OF BASES.

#### Examples:

1. Work out:  $32_{\text{five}} \times 2_{\text{five}}$ .

$$\begin{array}{r} \phantom{1} 3 \phantom{2} \text{ five} \\ \times \phantom{1} 2 \text{ five} \\ \hline \underline{114} \text{ five} \end{array}$$

base five digits are; 0 1 2 3 4  
 $2 \times 2 = 4$   
 $2 \times 3 = 6$        $6 \div 5 = 1 \text{ r } 1$

2. Multiply:  $101_{\text{two}}$

$$\begin{array}{r} \phantom{1} 01 \text{ two} \\ \times \phantom{1} 11 \text{ two} \\ \hline \phantom{1} 01 \\ + 101 \\ \hline \underline{1111} \text{ two} \end{array}$$

$$\begin{array}{l} 1 \times 1 = 1 \\ 1 \times 0 = 0 \\ 1 \times 1 = 1 \end{array}$$

$$\begin{array}{l} 1 \times 1 = 1 \\ 1 \times 0 = 0 \\ 1 \times 1 = 1 \end{array}$$

We can also multiply in bases by converting the numbers in the given base to base ten, then multiply and change the answer got back to the base indicated.

#### Example.

1. Multiply  $45_{\text{six}} \times 24_{\text{six}}$ .

$$\begin{aligned} 45_{\text{six}} &= (4 \times 6^1) + (5 \times 6^0) &= 24 + 5 &= 29_{\text{ten}} \\ 24_{\text{six}} &= (2 \times 6^1) + (4 \times 6^0) &= 12 + 4 &= 16_{\text{ten}}. \end{aligned}$$

$$\begin{array}{r} \phantom{5} 2 \phantom{9} \\ \times \phantom{1} 1 \phantom{6} \\ \hline \phantom{5} 1 \phantom{7} \phantom{4} \\ + \phantom{5} 2 \phantom{9} \\ \hline \underline{= 464} \text{ ten} \end{array}$$

Change  $464_{\text{ten}}$  to base six.

B	NO	R
6	464	
6	77	2
6	12	5
6	2	0
	0	2



$$464_{\text{ten}} = 2052_{\text{six}}$$

So,  $45_{\text{six}} \times 24_{\text{six}} = \underline{2052}_{\text{six}}$

#### ACTIVITY.

Multiply the following.

- $33_{\text{five}} \times 12_{\text{five}}$ .
- $13_{\text{four}} \times 33_{\text{four}}$ .
- $112_{\text{four}} \times 21_{\text{four}}$ .

- $25_{\text{six}} \times 13_{\text{six}}$ .
- Find the product of  $43_{\text{five}}$  and  $20_{\text{five}}$ .

## LESSON TWO

### TOPIC: NUMERATION SYSTEM AND PLACE VALUES.

#### SUBTOPIC: DIVISION OF BASES.

#### Example.

**Note:** When dividing numbers in bases, we first change the given bases to base ten and divide, then express the answer to the given base.

#### Example.

1. Divide  $144_{\text{five}} \div 12_{\text{five}}$ .

$$\begin{aligned} 144_{\text{five}} &= (1 \times 5^2) + (4 \times 5^1) + (4 \times 5^0) \\ &= (1 \times 5 \times 5) + (4 \times 5) + (4 \times 1) \\ &= 25 + 20 + 4 \\ &= 49 \end{aligned}$$

$$\begin{aligned} 12_{\text{five}} &= (1 \times 5^1) + (2 \times 5^0) \\ &= (1 \times 5) + (2 \times 1) \\ &= 5 + 2 \\ &= 7 \end{aligned}$$

$$\frac{49}{7} = 7_{\text{ten}}$$

Change  $7_{\text{ten}}$  to base 5.

B	NO	R
5	7	
5	1	2
	0	1



$$\underline{144_{\text{five}} \div 12_{\text{five}} = 12_{\text{five}}}$$

#### ACTIVITY.

Work out the following numbers.

- $22_{\text{five}} \div 4_{\text{five}}$
- $33_{\text{four}} \div 11_{\text{four}}$
- $46_{\text{nine}} \div 6_{\text{nine}}$
- $120_{\text{five}} \div 12_{\text{five}}$
- $11000_{\text{two}} \div 11_{\text{two}}$

## LESSON THREE

### TOPIC: OPERATION ON NUMBERS.

### SUBTOPIC: MATHEMATICAL PROPERTIES

#### CONTENT:

#### a) DISTRIBUTIVE PROPERTY

##### Examples:

Use the distributive property to work out:

$$\begin{aligned} \text{(i)} \quad & (379 \times 27) + (27 \times 21) \\ & \text{Re-arrange } (27 \times 379) + (27 \times 21) \\ & = (379 + 21) \times 27 \\ & = (400) \times 27 \\ & = 400 \times 27 \\ & = 10800 \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad & (137 \times 42) - (37 \times 42) \\ & \text{Re-arrange } (137 \times 42) - (37 \times 42) \\ & = (42 \times 137) - (42 \times 37) \\ & = (137 - 37) \times 42 \\ & = 100 \times 42 \\ & = 4200 \end{aligned}$$

#### b) ASSOCIATIVE PROPERTY

##### Example:

Use the associative property to work out:

$$\begin{aligned} (5 + 8) + 2 = 5 + (8 + 2) = (5 + 2) + 8 \quad & \text{The alteration of the positions of the brackets does not} \\ 13 + 2 = 5 + 10 \quad = 7 + 8 \quad & \text{change the result.} \\ 15 = 15 \quad = 15 \end{aligned}$$

$$\begin{aligned} (5 \times 8) \times 2 = 5 \times (8 \times 2) = (5 \times 2) \times 8 \quad & \text{The alteration of the positions of the brackets does not} \\ 40 \times 2 = 5 \times 16 = 10 \times 8 \quad & \text{change the result..} \\ 80 \quad = \quad 80 \quad = \quad 80 \end{aligned}$$

**Conclusion:** The associative property holds for both addition and multiplication only.

#### c) COMMUTATIVE PROPERTY

##### Example:

$$4 + 3 = 3 + 4 \quad \text{] What you start with does not affect the result.}$$

$$4 \times 3 = 3 \times 4 \quad \text{] What you start with does not affect the result.}$$

**Conclusion:** The commutative property holds for both addition and multiplication.

#### ACTIVITY:

1. Using distributive, work out the following

a)  $(79 \times 20) + (20 \times 21)$

b)  $(170 \times 10) - (10 \times 20)$

- c)  $(200 \div 15) + (100 \div 15)$   
 d)  $(543 \div 20) - (143 \div 20)$   
 2. Use the associative property to work out  
 a)  $4 + 7 + 9$   
 b)  $3 \times 6 \times 10$

## LESSON FOUR

### TOPIC : OPERATION ON NUMBERS.

#### SUBTOPIC: STANDARD FORM (whole numbers)

#### CONTENT.

- **Standard form is also called the Scientific form.**
- A number is in standard form when it is less than 10 and equal or greater than 1.
- For numbers which are greater than 10 and those less than 1, we express them as in above.
- Standard form is in relation to standard base i.e., base ten because they both use powers of ten.
- In expressing numbers in scientific form, we leave only one digit which is between 0 and 10 to the left of the decimal point.
- When the decimal point moves places to the left, it gives a positive power of ten (see example 1 and 2) and when it moves to the right, it gives a negative power of ten (see example 3 and 4).
- The power is determined by the number of places the point has moved.

#### Example

1. Express 246 in standard form.

$$246. = \frac{246}{100} = \underline{\underline{2.46 \times 10^2}}$$

In whole numbers, we consider the decimal point to be at the end of the figure given. So, the decimal point is at the right side of **6** and it moves two places to the left to leave only one digit. It will now be between **2** and **4** to give **2.46** then multiplied by **10** to power **2** since it moved two steps.

2. Write 34689 in standard form.

$$34689 = \frac{34689}{10000} = \underline{\underline{3.4689 \times 10^4}}$$

#### ACTIVITY

1. Express the following in scientific form.
- a) 3
  - b) 42
  - c) 853
  - d) 3498
  - e) 875609

## LESSON FIVE

**TOPIC : OPERATION ON NUMBERS.**

**SUBTOPIC: STANDARD FORM (decimal numbers)**

**CONTENT.**

1. Express 0.0257 in standard form.

$$0.257 = 0.0257 = \underline{2.57 \times 10^{-2}}$$

**NB: The decimal point moved to the two places to the right. So, it gives a negative power of ten.**

2. Write 0.0004 in Scientific form.

$$0.0004 = 0.0004 = \underline{4.0 \times 10^{-4} \text{ or } 4 \times 10^{-4}}$$

**NB: The decimal point moved to the four places to the right. So, it gives a negative power of ten.**

### ACTIVITY

Write the following in standard form.

- a) 0.36
- b) 0.8
- c) 0.125
- d) 23.453
- e) 0.000678