I- *Reduce the following to simplest possible form:*

1. $5^2 - 3^2 \times 2^2$

2. $2 \times (3 - 2^2)^3$

3. $(2^3 \times 3^5)^0$

4. $(25 - 4^2) \times 9^3$

5. $(2^3 - 3^5)^0$

6. $\dfrac{8^5 - 6 \times 2^{12}}{2^3 \times 4^5}$

II- Write the following in the form of prime bases (as fractions with lowest terms)*:*

a. $(25^{-1})^3 \times 125^2 \times (5^{-5})^{-2}$

b. $(6 \times 3^2)^3 \times (12 - 2^2)^4$

c. $(-3^{-2})^{-1} \times (-27^2)^5 \times 81$

d. $(15^2 \times 25^3)^4 \div 27^2$

III- Compare*:*

a. (-3^{12}) (-3^3)

b. (9^3) (3^6)

c. $(-4)^2$ $(-4)^5$

d. $(0)^5$ $(5)^0$

IV- Simplify the following expressions*:*

a. $-x^{-3} \times (-x^2) \times (-x^3)^2$

b. $\dfrac{25x^2 \times (12y^5)^3}{(15x^0)^3 \times (8y^2)^3}$

c. $\dfrac{6c}{15b} \times \dfrac{2ba^2}{3c^2} \div \dfrac{4a}{9bc}$

d. $4^x \times 8^{-2x} \times 2^{3x+1}$

V- Find x and y *:*

a. $4^2 \times 2^{x+1} \times 2^{-3} = 2^8$

b. $6^2 \times 2^{3x} \times 3^{2y-1} = 12^5$

c. $3^4 \times 9^{2x-1} \times 27^x = 81^3$

d. $\dfrac{(2^3 \times 4^y)}{2^{y-1}} = 8^5.$

VI- Write the following in the form of power of 10, then in decimal form*:*

a. $23 \times (10000)^{-1}.$

b. $0.0021 \times 100.$

c. $\dfrac{1}{4} \times 10^5 \times \left(0.2 \times 10^{-1}\right)^3$

d. $10^3 + 10^{-2}.$

VII- Consider the two numbers $x = -\dfrac{1}{3} \times 10^{-2}$ & $y = -6 \times 10^3.$

Determine: ***a-*** xy. ***b-*** $\dfrac{2x}{y}$. ***c-*** $\dfrac{x^2}{y}$.

VIII- Write in scientific notation*:*

a. $\dfrac{2 \times 10^3 - 2 \times 10^2}{22 \times 10^2}$

b. $10^{-1} + 10^{-3}$

c. 325×10^{-7}

d. $0.00125 \times 10^6.$

IX- Given $C=\frac{8^{20}+4^{10}}{8^4+4^{26}}$

1) Verify that $C=2^8$.
2) Write C in a scientific notation form.
3) Frame C between two consecutive powers of 10.

X- Pick up the only right answer, justifying yourself.

No.	Problem	Expected answer		
		A	B	C
1.	$5\times10^{-3}=$	50^{-3}	0.005	-150
2.	$10^3\times\left(-\frac{5}{2}\right)^{-2}\times\frac{5^{-1}}{2^{+3}}$	4	0	10
3.	$\frac{x^{-2}}{y^{-2}}\div\frac{y^{-1}}{x^{-1}}$	$(xy)^{-3}$	$\left(\frac{x}{y}\right)^3$	$\left(\frac{y}{x}\right)^3$
4.	2^3+2^{-3}	0	$\frac{65}{8}$	2^0
5.	$\left.\begin{array}{l}If\ r=11^{27}-11^{25}\\ and\ n=11^{25}-11^{24}\end{array}\right\}$,then	$\frac{r}{n}=110$	$\frac{r}{n}=132$	$\frac{r}{n}=121$
6.	If n is a natural & $n\neq0$ then $[(-45)^n]^2\times[(-7.5)^{2n+1}]^3$ is	Positive	Negative	We cannot tell unless solved

XI- Justify that the numerical expressions below are equivalent:

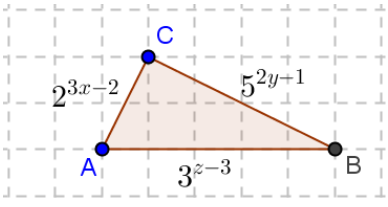
$R=\left(\frac{3}{4}\right)^2-\frac{1}{2}$ *and* $N=\left(\frac{3}{4}-\frac{1}{2}\right)^2$

XII- Consider the numbers: $B=\frac{-81\times10^5\times(5\times10^{-3})^2}{15^3\times10^{-2}}$ $C=0.001125$

a. Simplify *B*, and then write it in scientific notation.

b. Write *C* in the form of $d\times10^n$ where d is between 1 & 9 and n is an integer.

XIII- Assume that the adjacent figure is a right triangular piece of land.



a. Find the numerical values of x & y so that its area is 10^3m^2.

b. To fence this piece of land we used $222m$ of wires. Deduce the measure of the side $[AB]$.

c. Based on your calculation. Is the given piece of land right at C? Give a simple explanation.

XIV- Answer by ***true*** or ***false*** and justify your answer.

1) $A=\frac{3^8-9^3}{9^2+3^5}$ is a natural number.
2) If n is a non-zero natural number, then the sign of: $E=-[(-5)^{n+1}]^2\times[(-7)^{2n+1}]^3$ is negative.

XV- Let ***A***, ***B***, ***C*** and ***D*** are four points in the plane such that:

$$AB=\frac{(-7.2)^3\times(4.8)^2\times 27^2}{(-24)^2\times(-3.6)^5\times 9} \quad ; \; \boldsymbol{BC}=\frac{2}{3}+\frac{4}{5}\div\left(1+\frac{3}{5}\right)+\frac{5}{6} \quad ; \; \boldsymbol{AC}=\frac{49^4+5\times 7^9}{7^8\times 9}$$

1) a) Show that $\boldsymbol{AB}=2$.
   b) Reduce $\boldsymbol{BC}$.
   c) Verify that: $\boldsymbol{AC}=\boldsymbol{AB}+\boldsymbol{BC}$.

2) a) What can you deduce about the points ***A***, ***B*** and ***C***?
   b) Deduce the relative position of the point ***B*** with respect to [***AC***]. (Draw a figure)

3) Consider the numbers: $\boldsymbol{AD}=5^2\times\left(2^2+1\right)^2\div 5^3$ and $\boldsymbol{DC}=\boldsymbol{GCD}(65;75)$
   a. Write ***AD*** in the form of a power of 5.
   b. Calculate ***DC***.
   c. What is the relative positions of:
      i. The point ***D*** with respect to the points ***A*** and ***C***.
      ii. The straight line (***DB***) represent to the segment [***AC***]? Justify.

Mastering problems		
Chapter	*Exercises*	*Pages*
CH-: Powers	1,2,4,6,10,11,13,18 & 19	12 ⟶ 19
	3 & 4	240
	5 & 7	241