1.- Calcula:

a) $5 \cdot 5^{-2} \cdot 5^{3} = 5^{1-2+3} = 5^{2}$

b) $4^{3} : 4^{-3} = 4^{3-(-3)} = 4^{6}$

c) $10^{-3} : 2^{-3} = \frac{2^{3}}{10^{3}} = \frac{8}{1000} = 0{,}008$

d) $(-1)^{123} + (-42)^{0} + \left(\frac{1}{2}\right)^{-3} = -1 + 1 + 2^{3} = -1 + 1 + 8 = 8$

2.- Calcula:

a) $\left(\frac{-1}{3}\right)^{2} + 3^{0} - (-1)^{12} = \frac{1}{9} + 1 - 1 = \frac{1}{9}$

b) $2^{3} \cdot 2^{-3} \cdot 2^{-5} = 2^{-5}$

c) $12^{-2} : (-2)^{-2} = [12:(-2)]^{-2} = (-6)^{-2} = \frac{1}{36}$

d) $\left[(-3)^{2}\right]^{-5} = 9^{-5} = \frac{1}{9^{5}}$

3.- Calcula:

a) $\left(\frac{3}{4}\right)^{-2} : \left(\frac{1}{2}\right)^{-2} = \left(\frac{4}{3}\right)^{2} : 2^{2} = \frac{16}{9 \cdot 4} = \frac{4}{9}$

b) $\left[\left(\frac{2}{3}\right)^{3} : \left(\frac{2}{3}\right)^{-4}\right]^{3} = \frac{2^{9}}{3^{9}} : \frac{3^{12}}{2^{12}} = \frac{2^{21}}{3^{21}}$

c) $-1^{140} = 1$

d) $\left(2 - \frac{1}{3}\right)^{-2} = \left(\frac{5}{3}\right)^{-2} = \frac{3^{2}}{5^{2}} = \frac{9}{25}$

4.- Calcula:

a) $\left[\left(\frac{3}{2}\right)^{3} : \left(\frac{3}{2}\right)^{-2}\right]^{2} = \left(\frac{3^{3}}{2^{3}} : \frac{2^{2}}{3^{2}}\right)^{-2} = \left(\frac{3^{5}}{2^{5}}\right)^{-2} = \frac{2^{10}}{3^{10}}$

b) $\left(\frac{1}{2}\right)^{-2} \cdot \left(\frac{2}{5}\right)^{-2} = \left(\frac{1}{5}\right)^{-2} = 5^{2} = 25$

c) $\left(1 - \frac{1}{3}\right)^{-3} = \left(\frac{2}{3}\right)^{-3} = \frac{27}{8}$

d) $-4305^{0} = -1$

5.- Reduce a índice común los siguientes radicales:

a) $\sqrt[12]{3^{6}}$; $\sqrt[12]{3^{8}}$; $\sqrt[12]{3^{9}}$

b) $\sqrt[30]{2^{18}}$; $\sqrt[30]{2^{10}}$; $\sqrt[30]{2^{21}}$

6.- Calcula:

a) $2\sqrt{3} - 4\sqrt{3} + 5\sqrt{3} - 8\sqrt{3} = -5\sqrt{3}$

b) $\sqrt{3} \cdot \sqrt{5} \cdot \sqrt{17} = \sqrt{3 \cdot 5 \cdot 17} = \sqrt{255}$

c) $\sqrt{30} : \sqrt{6} = \sqrt{30:6} = \sqrt{5}$

d) $3\sqrt{2} + 4\sqrt{5} - 2\sqrt{5} + \sqrt{2} + 8\sqrt{2} = 12\sqrt{2} + 2\sqrt{5}$

7.- Calcula:

a) $\sqrt{2}\cdot\sqrt{11}\cdot\sqrt{5} = \sqrt{2\cdot 11\cdot 5} = \sqrt{110}$

b) $\sqrt{15} : \sqrt{3} = \sqrt{15 : 3} = \sqrt{5}$

c) $3\sqrt{2} - 2\sqrt{2} + 5\sqrt{2} = 6\sqrt{2}$

d) $\sqrt{2} - \sqrt{3} + 6\sqrt{3} - 2\sqrt{2} = 5\sqrt{3} - \sqrt{2}$

8.- Simplifica los siguientes radicales:

a) $\sqrt[10]{3^5} = \sqrt{3}$

b) $\sqrt[12]{2^3} = \sqrt[4]{2}$

c) $\sqrt[10]{5^4} = \sqrt[5]{5^2}$

d) $\sqrt[5]{3^{10}} = \sqrt{3^5}$

9.- Calcula:

a) $\frac{1}{2}\sqrt{3} - 2\sqrt{3} + \frac{3}{4}\sqrt{3} - 6\sqrt{3} = \left(\frac{1}{2} - 2 + \frac{3}{4} - 6\right)\sqrt{3} = -\frac{27}{4}\sqrt{3}$

b) $\frac{3}{2}\sqrt{2} - \frac{1}{5}\sqrt{2} + 3\sqrt{2} - \frac{3}{10}\sqrt{2} - 4\sqrt{2} = \left(\frac{3}{2} - \frac{1}{5} + 3 - \frac{3}{10} - 4\right)\sqrt{2} = 0$

10.- Calcula:

a) $\frac{3}{5}\sqrt{5} - 4\sqrt{5} + \frac{1}{15}\sqrt{5} - 3\sqrt{5} = \left(\frac{3}{5} - 4 + \frac{1}{15} - 3\right)\sqrt{5} = -\frac{19}{3}\sqrt{5}$

b) $2\sqrt{3} - 3 + \frac{1}{2}\sqrt{3} - \frac{4}{5}\sqrt{3} + \frac{1}{2} - \frac{1}{3}\sqrt{3} = -\frac{5}{2} + \frac{41}{30}\sqrt{3}$