(iii) We have to prove that $\left(\frac{1}{4}\right)^{-2}-3\times 8^{\frac{2}{3}}\times 4^{0}+\left(\frac{9}{16}\right)^{-\frac{1}{2}}=\frac{16}{3}$

Now,

$$\left(\frac{1}{4}\right)^{-2}-3\times 8^{\frac{2}{3}}\times 4^{0}+\left(\frac{9}{16}\right)^{-\frac{1}{2}}=\frac{1^{-2}}{4^{-2}}-3\times 2^{3\times\frac{2}{3}}\times 4^{0}+\frac{3^{2\times-\frac{1}{2}}}{4^{2\times-\frac{1}{2}}}$$

$$\Rightarrow\left(\frac{1}{4}\right)^{-2}-3\times 8^{\frac{2}{3}}\times 4^{0}+\left(\frac{9}{16}\right)^{-\frac{1}{2}}=\frac{1}{2^{2\times-2}}-3\times 2^{\cancel{3}\times\frac{2}{\cancel{3}}}\times 4^{0}+\frac{3^{\cancel{2}\times-\frac{1}{\cancel{2}}}}{2^{\cancel{4}\times-\frac{1}{\cancel{2}}}}$$

$$\Rightarrow\left(\frac{1}{4}\right)^{-2}-3\times 8^{\frac{2}{3}}\times 4^{0}+\left(\frac{9}{16}\right)^{-\frac{1}{2}}=\frac{1}{2^{-4}}-3\times 2^{2}\times 4^{0}+\frac{3^{-1}}{2^{-2}}$$

$$\Rightarrow\left(\frac{1}{4}\right)^{-2}-3\times 8^{\frac{2}{3}}\times 4^{0}+\left(\frac{9}{16}\right)^{-\frac{1}{2}}=\frac{1}{\frac{1}{2^{4}}}-3\times 2^{2}\times 4^{0}+\frac{\frac{1}{3}}{\frac{1}{2^{2}}}$$

$$\Rightarrow\left(\frac{1}{4}\right)^{-2}-3\times 8^{\frac{2}{3}}\times 4^{0}+\left(\frac{9}{16}\right)^{-\frac{1}{2}}=1\times\frac{2^{4}}{1}-3\times 2^{2}\times 1+\frac{1}{3}\times\frac{2^{2}}{1}$$

$$\Rightarrow\left(\frac{1}{4}\right)^{-2}-3\times 8^{\frac{2}{3}}\times 4^{0}+\left(\frac{9}{16}\right)^{-\frac{1}{2}}=\frac{16}{1}-\frac{12}{1}+\frac{4}{3}=\frac{16}{3}$$

Hence, $\boxed{\left(\frac{1}{4}\right)^{-2}-3\times 8^{\frac{2}{3}}\times 4^{0}+\left(\frac{9}{16}\right)^{-\frac{1}{2}}=\frac{16}{3}}$

(iv) We have to prove that $\frac{2^{\frac{1}{2}} \times 3^{\frac{1}{3}} \times 4^{\frac{1}{4}}}{10^{\frac{-1}{5}} \times 5^{\frac{3}{5}}} \div \frac{3^{\frac{4}{3}} \times 5^{\frac{-7}{5}}}{4^{\frac{-3}{5}} \times 6} = 10$. So,

Let $x = \frac{2^{\frac{1}{2}} \times 3^{\frac{1}{3}} \times 4^{\frac{1}{4}}}{10^{\frac{-1}{5}} \times 5^{\frac{3}{5}}} \div \frac{3^{\frac{4}{3}} \times 5^{\frac{-7}{5}}}{4^{\frac{-3}{5}} \times 6}$

$$x = \frac{2^{\frac{1}{2}} \times 3^{\frac{1}{3}} \times 4^{\frac{1}{4}}}{10^{\frac{-1}{5}} \times 5^{\frac{3}{5}}} \div \frac{3^{\frac{4}{3}} \times 5^{\frac{-7}{5}}}{4^{\frac{-3}{5}} \times 6}$$

$$= \frac{2^{\frac{1}{2}} \times 3^{\frac{1}{3}} \times 2^{2\times\frac{1}{4}}}{5^{\frac{-1}{5}} \times 2^{\frac{-1}{5}} \times 5^{\frac{3}{5}}} \div \frac{3^{\frac{4}{3}} \times 5^{\frac{-7}{5}}}{2^{2\times\frac{-3}{5}} \times 3 \times 2}$$

$$= \frac{2^{\frac{1}{2}} \times 3^{\frac{1}{3}} \times 2^{2\times\frac{1}{4}}}{5^{\frac{-1}{5}} \times 2^{\frac{-1}{5}} \times 5^{\frac{3}{5}}} \div \frac{3^{\frac{4}{3}} \times 5^{\frac{-7}{5}}}{2^{2\times\frac{-3}{5}} \times 3 \times 2}$$

$$= \frac{2^{\frac{1}{2}+\frac{1}{2}+\frac{1}{5}} \times 3^{\frac{1}{3}}}{5^{\frac{-1}{5}+\frac{3}{5}}} \div \frac{3^{\frac{4}{3}-1} \times 5^{\frac{-7}{5}}}{2^{\frac{-6}{5}+1}}$$

$$x = \frac{2^{\frac{1\times5}{2\times5}+\frac{1\times5}{2\times5}+\frac{1\times2}{2\times5}} \times 3^{\frac{1}{3}}}{5^{\frac{-1+3}{5}}} \div \frac{3^{\frac{4}{3}-\frac{1\times3}{1\times3}} \times 5^{\frac{-7}{5}}}{2^{\frac{-6}{5}+\frac{1\times5}{1\times5}}}$$

$$= \frac{2^{\frac{5}{10}+\frac{5}{10}+\frac{2}{10}} \times 3^{\frac{1}{3}}}{5^{\frac{2}{5}}} \div \frac{3^{\frac{4-3}{3}} \times 5^{\frac{-7}{5}}}{2^{\frac{-6+5}{5}}}$$

$$= \frac{2^{\frac{12}{10}} \times 3^{\frac{1}{3}}}{5^{\frac{2}{5}}} \div \frac{3^{\frac{1}{3}} \times 5^{\frac{-7}{5}}}{2^{\frac{-1}{5}}}$$

$$= \frac{2^{\frac{12}{10}} \times 3^{\frac{1}{3}}}{\frac{5^{\frac{2}{5}}}{1}} \div \frac{3^{\frac{1}{3}} \times 5^{\frac{-7}{5}}}{\frac{1}{2^{\frac{1}{5}}}}$$

$$x = \frac{2^{\frac{12}{10}} \times 3^{\frac{1}{3}} \times \frac{1}{5^{\frac{2}{5}}}}{\frac{3^{\frac{1}{3}}}{1} \times \frac{1}{5^{\frac{7}{5}}} \times \frac{2^{\frac{1}{5}}}{1}}$$

$$= 2^{\frac{12}{10}} \times 3^{\frac{1}{3}} \times \frac{1}{5^{\frac{2}{5}}} \times \frac{1}{3^{\frac{1}{3}}} \times \frac{5^{\frac{7}{5}}}{1} \times \frac{1}{2^{\frac{1}{5}}}$$

$$= 2^{\frac{12}{10}-\frac{1}{5}} \times \cancel{3^{\frac{1}{3}}} \times \frac{1}{\cancel{3^{\frac{1}{3}}}} \times 5^{\frac{7}{5}-\frac{2}{5}}$$

$$= 2^{\frac{12}{10}-\frac{1\times2}{5\times2}} \times 5^{\frac{7-2}{5}}$$

$$x = 2^{\frac{12-2}{10}} \times 5^{\frac{5}{5}}$$

$$= 2^{\frac{10}{10}} \times 5^{\frac{5}{5}}$$

$$= 2 \times 5 = 10$$

Hence, $\dfrac{2^{\frac{1}{2}} \times 3^{\frac{1}{3}} \times 4^{\frac{1}{4}}}{10^{\frac{-1}{5}} \times 5^{\frac{3}{5}}} \div \dfrac{3^{\frac{4}{3}} \times 5^{\frac{-7}{5}}}{4^{\frac{-3}{5}} \times 6} = 10$

********** END **********