$$= \frac{1}{2} + \frac{1}{\dfrac{1}{10^{2 \times \frac{1}{2}}}} - 3^2$$

$$x = \frac{1}{2} + \frac{1}{\dfrac{1}{10}} - 3^2$$

$$= \frac{1}{2} + 1 \times \frac{10}{1} - 3 \times 3$$

$$= \frac{1}{2} + 10 - 9$$

$$= \frac{3}{2}$$

Hence, $\sqrt{\dfrac{1}{4}} + (0.01)^{\frac{-1}{2}} - (27)^{\frac{2}{3}} = \dfrac{3}{2}$

(vi) We have to prove that $\dfrac{2^n + 2^{n-1}}{2^{n+1} - 2^n} = \dfrac{3}{2}$. So,

Let $x = \dfrac{2^n + 2^{n-1}}{2^{n+1} - 2^n}$

$$x = \dfrac{2^n + 2^{n-1}}{2^{n+1} - 2^n}$$

$$= \dfrac{2^n\left(1 + 1 \times 2^{-1}\right)}{2^n\left(2^1 - 1\right)}$$

$$= \dfrac{\cancel{2^n}\left(1 + 1 \times 2^{-1}\right)}{\cancel{2^n}\left(2^1 - 1\right)}$$

$$= \dfrac{\left(1 + \dfrac{1}{2}\right)}{2 - 1}$$

$$\Rightarrow x = \dfrac{3}{2}$$

Hence, $\dfrac{2^n + 2^{n-1}}{2^{n+1} - 2^n} = \dfrac{3}{2}$

(vii) We have to prove that $\left(\dfrac{64}{125}\right)^{\frac{-2}{3}} + \dfrac{1}{\left(\dfrac{256}{625}\right)^{\frac{1}{4}}} + \left(\dfrac{\sqrt{25}}{\sqrt[3]{64}}\right) = \dfrac{65}{16}$. So let

$$x = \left(\dfrac{64}{125}\right)^{\frac{-2}{3}} + \dfrac{1}{\left(\dfrac{256}{625}\right)^{\frac{1}{4}}} + \left(\dfrac{\sqrt{25}}{\sqrt[3]{64}}\right)$$

$$x = \dfrac{2^{6 \times -\frac{2}{3}}}{5^{3 \times -\frac{2}{3}}} + \dfrac{1}{\dfrac{2^{8 \times \frac{1}{4}}}{5^{4 \times \frac{1}{4}}}} + \dfrac{\sqrt{5 \times 5}}{\sqrt[3]{4 \times 4 \times 4}}$$

$$= \dfrac{2^{\cancel{6} \times -\frac{2}{\cancel{3}}}}{5^{\cancel{3} \times -\frac{2}{\cancel{3}}}} + \dfrac{1}{\dfrac{2^{\cancel{8} \times \frac{1}{\cancel{4}}}}{5^{\cancel{4} \times \frac{1}{\cancel{4}}}}} + \dfrac{5}{4}$$

$$= \dfrac{2^{-4}}{5^{-2}} + \dfrac{1}{\dfrac{2^2}{5}} + \dfrac{5}{4}$$

$$= \dfrac{\dfrac{1}{2^4}}{\dfrac{1}{5^2}} + \dfrac{5}{2^2} + \dfrac{5}{4}$$

$$\Rightarrow x = \dfrac{1}{16} \times \dfrac{25}{1} + \dfrac{5}{4} + \dfrac{5}{4} = \dfrac{65}{16}$$

By taking least common factor we get

$$x = \dfrac{25 + 20 + 20}{16} = \dfrac{65}{16} = \dfrac{65}{16}$$

Hence, $\left(\dfrac{64}{125}\right)^{\frac{-2}{3}} + \dfrac{1}{\left(\dfrac{256}{625}\right)^{\frac{1}{4}}} + \left(\dfrac{\sqrt{25}}{3\sqrt{64}}\right) = \dfrac{65}{16}$

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