Solution of Recitation - R.6 **Done by: A. Al-Shallali**

Q1) $x = \left[(-8)^{1/3}\right]^{-2} = (-2)^{-2} = \dfrac{1}{(-2)^2} = \dfrac{1}{4}$, $y = \left(\dfrac{1}{16}\right)^{-3/2} = (16)^{3/2} = \left((16)^{1/2}\right)^3 = 4^3 = 64.$

Thus $x + y = \dfrac{1}{4} + 64 = \dfrac{257}{4}$

Q2) $= \dfrac{x^{1/2}\, y^2\, x^{-3/2}\, \cancel{y^{3/2}}}{x^{-6}\, \cancel{y^{3/2}}} = x^{\frac{1}{2} - \frac{3}{2} + 6}\, y^2 = x^5 y^2 = (2)^5\, (1/2)^2 = 2^3 = 8$

Q3) $= \left[\dfrac{x^{-1} - y^{-1}}{(xy)^{-2}} \cdot \dfrac{x^2 y^2}{x^2 y^2}\right] \cdot \left[\dfrac{(xy)^{-3}}{x^{-2} - y^{-2}} \cdot \dfrac{x^3 y^3}{x^3 y^3}\right] = \dfrac{xy^2 - x^2 y}{1} \cdot \dfrac{1}{xy^3 - x^3 y}$

$= \dfrac{\cancel{(xy)}\,(y - x)}{\cancel{(xy)}\,(y^2 - x^2)} = \dfrac{\cancel{(y - x)}}{\cancel{(y - x)}\,(y + x)} = \dfrac{1}{x + y}$

Q4) $= \left(\dfrac{1}{y^2} - \dfrac{1}{x^2}\right)^{-3n} \cdot \left(x^2 - y^2\right)^{2n} \cdot \left(x^2 y^2\right)^{-3n} = \left(\dfrac{x^2 - y^2}{x^2 y^2}\right)^{-3n} \cdot \left(x^2 - y^2\right)^{2n} \cdot \left(x^2 y^2\right)^{-3n}$

$= \dfrac{\cancel{\left(x^2 y^2\right)^{3n}}}{\left(x^2 - y^2\right)^{3n}} \cdot \left(x^2 - y^2\right)^{2n} \cdot \dfrac{1}{\cancel{\left(x^2 y^2\right)^{3n}}} = \left(x^2 - y^2\right)^{-n} = \dfrac{1}{\left(x^2 - y^2\right)^n}$ which's part (a).

Q5) (a) $= \dfrac{2^{x+4} - 2^{x+1}}{2^{x+4}} = 2^{(x+4)-(x+4)} - 2^{(x+1)-(x+4)} = 1 - 2^{-3} = 1 - \dfrac{1}{8} = \dfrac{7}{8},$

Since the value is not $\frac{1}{4}$, so it's false.

(b) $(x + y)^{-1} = x^{-1} + y^{-1}$ is false, because $(x + y)^{-1} = \dfrac{1}{x + y}$ while $x^{-1} + y^{-1} = \dfrac{y + x}{xy}$

(c) $= \left(1 + \frac{1}{8}\right)^{-1} + (1 + 8)^{-1} = \left(\dfrac{9}{8}\right)^{-1} + 9^{-1} = \dfrac{8}{9} + \dfrac{1}{9} = 1$ is true.

(d) $= \dfrac{1}{x} - \dfrac{1}{x - 1} - \dfrac{x + 1}{x} = \dfrac{1 - x - 1}{x} - \dfrac{1}{x - 1} = \dfrac{-x}{x} - \dfrac{1}{x - 1} = -1 - \dfrac{1}{x - 1} = \dfrac{-x + 1 - 1}{x - 1}$

$= -\dfrac{x}{x - 1}$. Again, it's false $\left(\neq \dfrac{x}{x + 1}\right)$