Chapter 0 Revision1- brief solution

1. Simplify $\left(x^5\right)^4\left(-2x\sqrt{y}\right)^2$ Ans: $4x^{22}y$

$= \left(x^{20}\right)\left(4x^2y\right)$

2. Simplify $\dfrac{4^x \cdot 8^{x+2}}{2^{x+6} \cdot 4^{2x}}$ Ans: 1

$= \dfrac{2^{2x} \cdot 2^{3(x+2)}}{2^{x+6} \cdot 2^{2(2x)}}$

3. If $2x^{\frac{1}{3}} = 4^{\frac{1}{3}}$, find x Ans: $x = \dfrac{1}{2}$

$\left(2x^{\frac{1}{3}}\right)^3 = \left(4^{\frac{1}{3}}\right)^3 \quad \therefore \quad 2^3 x = 4$

4. Solve $5 - 6^{x+4} = 4$ Ans: $x = -4$

Method 1:

$6^{x+4} = 1 \qquad (x+4)\log 6 = \log 1 = 0$

Method 2:

$6^{x+4} = 1 \qquad 6^{x+4} = 6^0 \quad \therefore x + 4 = 0$

5. Solve $4x^{-\frac{1}{3}} = 64^{\frac{2}{3}}$ Ans: $x = \dfrac{1}{64}$

$\left(4x^{-\frac{1}{3}}\right)^{-3} = \left(64^{\frac{2}{3}}\right)^{-3} \qquad 4^{-3}x = 64^{-2} \qquad \therefore \dfrac{1}{4^3}x = \dfrac{1}{64^2}$

6. Without using calculator, evaluate $2\log\dfrac{3}{2} + \log\dfrac{8}{9} - \log 2$ Ans: 0

$2\log\dfrac{3}{2} + \log\dfrac{8}{9} - \log 2 = \log\left(\left(\dfrac{3}{2}\right)^2 \cdot \dfrac{8}{9} \cdot \dfrac{1}{2}\right)$

7. Without using calculator, evaluate $\log 3^6 + \log\left(\dfrac{1}{9}\right)^3$ Ans: 0

$\log 3^6 + \log\left(\dfrac{1}{9}\right)^3 = \log\left[3^6 \cdot \left(\dfrac{1}{9}\right)^3\right] = \log\left(\dfrac{3^6}{3^{2\cdot 3}}\right)$

8. Simplify $\dfrac{2\log x-\log\frac{1}{x}}{\log x^3+4\log x}$ Ans: $\dfrac{3}{7}$

$$\frac{2\log x-\log\frac{1}{x}}{\log x^3+4\log x}=\frac{\log\left(x^2\cdot x\right)}{\log\left(x^3\cdot x^4\right)}=\frac{\log x^3}{\log x^7}$$

9. Solve $\log(5x-4)-\log(2x-1)=1+\log\dfrac{1}{5}$ Ans: $x=2$

$$\log(5x-4)-\log(2x-1)=1+\log\frac{1}{5}=\log 10+\log\frac{1}{5}=\log 2$$

$$\log\left(\frac{5x-4}{2x-1}\right)=\log 2 \qquad \therefore\left(\frac{5x-4}{2x-1}\right)=2$$

10. Solve $5^{2x-1}=7^{3x+1}$, giving the answers correct to 2 decimal places

Ans: $x=-1.36$

$$(2x-1)\log 5=(3x+1)\log 7$$

$$2x\log 5-3x\log 7=\log 7+\log 5$$

$$x(2\log 5-3\log 7)=\log 7+\log 5$$