Tutorial 3

① (a) $(2^n \times 8^{2n})^{\frac{1}{n}}$

$= (2^n \times (2^3)^{2n})^{\frac{1}{n}}$

$= (2^n \times 2^{6n})^{\frac{1}{n}}$

$= (2^{n+6n})^{\frac{1}{n}}$

$= (2^{7n})^{\frac{1}{n}}$

$= 2^7$

(b) $\frac{6^2 x^6}{6^5} = 6^{2-5} x^6$

$= 6^{-3} x^6$

$= \frac{x^6}{6^3}$

② (a) $\frac{4^{2x+1}}{4^{3+x} \times 4^{2+x}}$

$= \frac{4^{2x+1}}{4^{3+x+2+x}}$

$= \frac{4^{2x+1}}{4^{5+2x}}$

$= 4^{2x+1-(5+2x)}$

$= 4^{2x+1-5-2x}$

$= 4^{-4}$

$= \frac{1}{4^4}$

(b) $\frac{7^{2(k+3)} \times 7^{3k+2} \times 7^{2-k}}{49^{5+3k}}$

$= \frac{7^{2k+6+3k+2+2-k}}{(7^2)^{5+3k}}$

$= \frac{7^{4k+10}}{7^{10+6k}}$

$= 7^{4k+10-10-6k}$

$= 7^{-2k}$

$= \frac{1}{7^{2k}}$

(3) (a) $7^{2x+10} = 9^{3x}(3^{5x})$

$(3^3)^{2x+10} = (3^2)^{3x}(3^{5x})$

$3^{6x+30} = 3^{6x+5x}$

$6x+30 = 6x+5x$

$6x+30 = 11x$

$6x-6x+30 = 11x-6x$

$\frac{5x}{5} = \frac{30}{5}$

$x = 6.$

(b) $8^{k} - 64^{5-k} = 0$

$(2^3)^{3k} - (2^6)^{5-k} = 0$

$2^{9k} = 2^{30-6k}$

$9k = 30-6k$

$9k+6k = 30-6k+6k$

$\frac{15k}{15} = \frac{30}{15}$

$k = 2.$

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