Exponential Number

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$$a \times x^n + b \times x^n - c \times x^n = x^n(a+b+c)$$
$$x^n \times x^b = x^n + b$$
$$\frac{x^n}{x^b} = x^n - b$$
$$a^n \times b^n = (a\ timesb)^n$$
$$\frac{a}{b}^{-x} = \frac{b^x}{a^x}$$

Problem 0.1 $-2x = a$ **ise** $8^x + 1$**'in** a **cinsinden eşiti?**

Sol.

$$2^{3x} \times 2^3 = 8a^3$$
$$(a^3)$$

□

Problem 0.2 $-2^x + 2^{x+1} = 48$ **ise** $x =?$

Sol.

$$2^x(1+2) = 2^{x \times 3} = 48$$
$$2^x = 16$$
$$x = 4$$

□

Problem 0.3 $-a = 3^x + 1$**,** $b = 3^{-x} + 1$ **ise** $\frac{a}{b} =?$

Sol.

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

□

Problem 0.4 – $2^{x-1} = 5$ **ise** $0,5^2x + 1 =?$

Sol.

$$2^x \times \frac{1}{2} = 5 \qquad \frac{1}{2}^2 \times \frac{1}{2}$$
$$2^x = 10 \qquad \frac{1^x}{4^x} \times \frac{1}{2}$$
$$(2^2x)$$
$$\frac{1}{10^2} = \frac{1}{2} = \frac{1}{100} \times \frac{1}{2} = \frac{1}{200}$$

□

Problem 0.5 – $\frac{8^5 \times 9^4}{2^1 2 \times 3^6} =?$

Sol.

$$\frac{2^{15} \times 3^8}{2^{12} \times 3^6} = 2^3 \times 3^2 = 72$$

□

Problem 0.6 – $\frac{2^{2x-1}+4^{x+1}}{8^{x-1}} =?$

Sol.

$$\frac{2^{2x} \times 2^{-1} + 2^{2x} \times 2^2}{2^{3x} \times 2^{-3}} \qquad = 2^{-x} \times \frac{\frac{9}{2}}{\frac{1}{8}}$$
$$= \frac{2^{2x}(2^{-1} + 2^2)}{2^{3x} \times 2^{-3}} = \frac{9}{2} \qquad = 2^{-x} \times 36$$

□

Problem 0.7 – $2^x = 9$, $3^y = 10$, $5^z = 15$ **ise** x, y, z **sıralaması?**

Sol.

$$3 < x < 4 \qquad 1 < z < 2$$
$$2 < y < 3 \qquad x > y > z$$

□

Problem 0.8 – **a ve b sayma sayılarıdır.** $\frac{4^a \times 5^{4b}}{100}$ **sayısı 19 basamaklı en küçük doğal sayıya eşit olduğuna göre** $a \times b =?$

Sol.

$$2^{2a} \times 5^{4b} = 10^{20}$$
$$a = 10$$
$$b = 5$$
$$a \times b = 50$$

□

Problem 0.9 – $\frac{2^x+2^x+2^x+2^{x+1}}{5^x+5^x} = \frac{4}{25}$ **ise** $x =?$

Sol.

$$\frac{2^x(1+1+1+2)}{5^x(1+1)} \qquad \left(\frac{5}{2}\right)^3 = \left(\frac{5}{2}\right)^x$$
$$\frac{2^x \times 5}{5^x \times 2} = \frac{2^2}{5^2} \qquad x = 3$$

□

Problem 0.10 – $4^y = 32$, $4^x = 8$ **ise** $\frac{x+y}{x-y} =?$

Sol.

$$2^{2y} = 2^5 \qquad 2^{2x} = 2^3$$
$$2y = 5 \qquad 2x = 3$$
$$y = \frac{5}{2} \qquad x = \frac{3}{2}$$
$$\frac{\frac{8}{2}}{\frac{-2}{2}} = -4$$

□

Problem 0.11 – $(x-2)^{3x} - 2 = 1$ **ise** x **değerleri toplamı?**

Sol.

$$x = \left\{3, \frac{2}{3}\right\}$$
$$3 + \frac{2}{3} = \frac{11}{3}$$

□

Problem 0.12 – $3^x = 5^y$ **olduğuna göre** $\left(\frac{1}{3^y}\right)^{2x} + (5^y)^{\frac{1}{x}} =?$

Sol.

$$3 = \frac{5^y}{x} = (5^y)^{x-1} \qquad \left(\frac{1}{3^y}\right)^{2x} = \left(\frac{3^x}{y}\right)^2 = 5^2$$
$$5 = \frac{3^x}{y} \qquad 25 + 3 = 28$$

□