L6 - L7

- Repetition logaritmlagarna
- Potenslagar

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a) $2 \cdot 3^x = 4^x$

$\lg(2 \cdot 3^x) = \lg(4^x)$

$\lg 2 + \lg 3^x = x \cdot \lg 4$

$\lg 2 + x \cdot \lg 3 = x \cdot \lg 4$

$\lg 2 = x \cdot \lg 4 - x \cdot \lg 3$

$\lg 2 = x(\lg 4 - \lg 3)$

$$\frac{\lg 2}{\lg \frac{4}{3}} = \frac{x \cdot \cancel{\lg \frac{4}{3}}}{\cancel{\lg \frac{4}{3}}}$$

$$x = \frac{\lg 2}{\lg \frac{4}{3}}$$

Logaritmlagarna

$\lg(a \cdot b) = \lg a + \lg b$ (1)

$\lg \frac{a}{b} = \lg a - \lg b$ (2)

$\lg a^b = b \cdot \lg a$ (3)

Ex 2

a) $3^2 \cdot 3^5 = 3^{2+5} = 3^7$ samma bas

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

b) $\frac{5^3}{5^2} = \frac{\cancel{5} \cdot \cancel{5} \cdot 5}{\cancel{5} \cdot \cancel{5}} = 5^{3-2} = 5^1$

$81 = 3^x$

$81 = 9^2$

$9 = 3^2$

$81 = 9^2 = (3^2)^2 = 3^{2 \cdot 2} = 3^4$

Potenslagarna

$a^x \cdot a^y = a^{x+y}$

$\frac{b^x}{b^y} = b^{x-y}$

$(a^x)^y = a^{x \cdot y}$

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$$\begin{cases} 1)\ \lg x + \lg y = 1 \\ 2)\ x \cdot \lg(2y) = 2 \end{cases}$$

$\lg(x \cdot y) = 1$

$x = \frac{20}{z}$

$2y = z$

$\lg\left(z^{\frac{20}{z}}\right) = \lg 100$

$\frac{20}{z} \lg z = 2$

$10^{x \cdot \lg 2y} = 10^2$

$\left(10^{\lg 2y}\right)^x = 10^2$

$$\begin{cases} (2y)^x = 100 \\ x \cdot y = 10 \end{cases} \qquad \begin{cases} (2y)^x = 100 \\ x = \frac{10}{y} \end{cases}$$

$(2y)^{\frac{2 \cdot 10}{2 \cdot y}} = 100$

$$\frac{2)}{1)} \qquad \frac{\cancel{x} \cdot \lg 2y}{\cancel{x}} = \frac{2}{10/y}$$

$$\lg 2y = \frac{y}{5}$$

$$\begin{cases} 1) & x = \dfrac{10}{y} \\ 2) & x \cdot \lg 2y = 2 \end{cases}$$

Løs eks.

$$\boxed{\frac{x^1}{x^{1/3}} = 14}$$

$$\frac{52{,}4}{52{,}4^{1/3}} = 14$$

$$x^{1-\frac{1}{3}} = 14$$

$$x^{2/3} = 14$$

$$\left(x^{2/3}\right)^{3/2} = 14^{3/2}$$

$$x \approx 52{,}4$$