

Hatványozás azonosságok

Elnevezés	Azonosság	Példák	
E1	$a^{\textcolor{red}{n}} \cdot a^{\textcolor{blue}{m}} = a^{\textcolor{red}{n}+\textcolor{blue}{m}}$	$2^{\textcolor{red}{3}} \cdot 2^{\textcolor{blue}{5}} = 2^{\textcolor{red}{3+5}} = 2^8$	$2^{\textcolor{red}{x}+2} = 2^{\textcolor{red}{x}} \cdot 2^{\textcolor{blue}{2}}$
		$x^{\textcolor{red}{4}} \cdot x^{\textcolor{blue}{7}} = x^{\textcolor{red}{4+7}} = x^{11}$	$x^{\textcolor{red}{y}+4} = x^{\textcolor{red}{y}} \cdot x^4$
E2	$\frac{a^{\textcolor{teal}{n}}}{a^{\textcolor{blue}{m}}} = a^{\textcolor{red}{n}-\textcolor{blue}{m}}$	$\frac{2^{\textcolor{red}{7}}}{2^{\textcolor{blue}{2}}} = 2^{\textcolor{red}{7-2}} = 2^5$	$2^{\textcolor{red}{x}-3} = \frac{2^{\textcolor{red}{x}}}{2^3}$
		$\frac{x^{\textcolor{red}{2}}}{x^{\textcolor{blue}{4}}} = x^{\textcolor{red}{2-4}} = x^{-2}$	$x^{\textcolor{red}{y}-5} = \frac{x^{\textcolor{red}{y}}}{x^5}$
E3	$a^{\textcolor{teal}{n}} \cdot b^{\textcolor{blue}{n}} = (a \cdot b)^{\textcolor{red}{n}}$	$2^{\textcolor{red}{x}} \cdot 3^{\textcolor{blue}{x}} = (2 \cdot 3)^{\textcolor{red}{x}} = 6^{\textcolor{red}{x}}$	$10^{\textcolor{red}{x}} = (2 \cdot 5)^{\textcolor{red}{x}} = 2^{\textcolor{red}{x}} \cdot 5^{\textcolor{blue}{x}}$
		$x^{\textcolor{red}{2}} \cdot y^{\textcolor{blue}{2}} = (\textcolor{teal}{x} \cdot y)^{\textcolor{red}{2}}$	$(\textcolor{teal}{x} \cdot y)^{\textcolor{red}{4}} = \textcolor{teal}{x}^4 \cdot y^4$
E4	$\frac{a^{\textcolor{teal}{n}}}{b^{\textcolor{blue}{n}}} = \left(\frac{a}{b}\right)^{\textcolor{red}{n}}$	$\frac{3^{\textcolor{red}{x}}}{5^{\textcolor{blue}{x}}} = \left(\frac{3}{5}\right)^{\textcolor{red}{x}}$	$\left(\frac{7}{8}\right)^{\textcolor{red}{x}} = \frac{7^{\textcolor{red}{x}}}{8^{\textcolor{blue}{x}}}$
		$\frac{x^{\textcolor{red}{5}}}{y^{\textcolor{blue}{5}}} = \left(\frac{x}{y}\right)^{\textcolor{red}{5}}$	$\left(\frac{x}{y}\right)^{\textcolor{red}{3}} = \frac{x^{\textcolor{red}{3}}}{y^3}$
E5	$(a^{\textcolor{red}{n}})^{\textcolor{blue}{m}} = (a^{\textcolor{blue}{m}})^{\textcolor{red}{n}} = a^{\textcolor{red}{n} \cdot \textcolor{blue}{m}}$	$(3^2)^5 = 3^{2 \cdot 5} = 3^{10}$	$5^{2 \cdot 4} = (5^2)^4$
		$(x^3)^4 = x^{3 \cdot 4} = x^{12}$	$x^{7 \cdot 5} = (x^7)^5$
		$(4^7)^9 = (4^9)^7$	$(x^3)^8 = (x^8)^3$
E6	$a^{\textcolor{red}{1}} = a$	$2^{\textcolor{red}{1}} = 2$	$5 = 5^{\textcolor{red}{1}}$
		$x^{\textcolor{red}{1}} = x$	$y = y^{\textcolor{red}{1}}$
E7	$a^{\textcolor{red}{0}} = 1$	$3^{\textcolor{red}{0}} = 1$	$1 = 6^{\textcolor{red}{0}}$
		$x^{\textcolor{red}{0}} = 1$	$1 = x^{\textcolor{red}{0}}$
E8	$a^{-1} = \frac{1}{a}$	$2^{-1} = \frac{1}{2}$	$\frac{1}{3} = 3^{-1}$
		$x^{-1} = \frac{1}{x}$	$\frac{1}{y} = y^{-1}$
E9	$a^{-\textcolor{red}{n}} = \frac{1}{a^{\textcolor{red}{n}}}$	$4^{-2} = \frac{1}{4^2} = \frac{1}{16}$	$\frac{1}{5^4} = 5^{-4}$
		$x^{-12} = \frac{1}{x^{12}}$	$\frac{1}{y^5} = y^{-5}$

Logaritmus azonosságok

Elnevezés	Azonosság	Példák
L1	$\log_a b = c \rightarrow a^c = b$	$\log_2 x = 5 \rightarrow 2^5 = x$ $\log_3 27 = x \rightarrow 3^x = 27$ $\log_x 16 = 4 \rightarrow x^4 = 16$
L2	$\log_{10} x = \lg x = \log x$	-
L3	$\log_e x = \ln x$	-
L4	$\log_a(x \cdot y) = \log_a x + \log_a y$	$\log_3(2 \cdot 9) = \log_3 2 + \log_3 9$ $\log_5 7 + \log_5 9 = \log_5(7 \cdot 9)$
L5	$\log_a\left(\frac{x}{y}\right) = \log_a x - \log_a y$	$\log_8\left(\frac{3}{10}\right) = \log_8 3 - \log_8 10$ $\log_4 2 - \log_4 8 = \log_4\left(\frac{2}{8}\right)$
L6	$\log_a x^n = n \cdot \log_a x$	$\log_5 x^3 = 3 \cdot \log_5 x$ $4 \cdot \log_3 x = \log_3 x^4$
L7	$\log_a \sqrt[n]{x} = \frac{1}{n} \cdot \log_a x$	$\log_9 \sqrt[5]{3} = \frac{1}{5} \cdot \log_9 3$ $\frac{1}{3} \cdot \log_2 8 = \log_2 \sqrt[3]{8}$
L8	$\log_a a = 1$	$\log_2 2 = 1$ $\log_x x = 1$
L9	$\log_a 1 = 0$	$\log_2 1 = 0$ $\log_x 1 = 0$
L10	$\log_a x = \frac{\log_b x}{\log_b a}$	$\log_5 8 = \frac{\log_{10} 8}{\log_{10} 5}$
L11	$b = \log_a a^b$	$2 = \log_3 3^2$
L12	$a^{\log_b c} = c^{\log_b a}$	$2^{\log_4 x} = x^{\log_4 2}$

Gyökvonás azonosságok

Elnevezés	Azonosság	Példák
GY1	$\sqrt{a} \cdot \sqrt{b} = \sqrt{a \cdot b}$	$\sqrt{2} \cdot \sqrt{3} = \sqrt{2 \cdot 3} = \sqrt{6}$ $\sqrt{5 \cdot x} = \sqrt{5} \cdot \sqrt{x}$
GY2	$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$	$\frac{\sqrt{x}}{\sqrt{7}} = \sqrt{\frac{x}{7}}$ $\frac{\sqrt{16}}{\sqrt{4}} = \sqrt{\frac{16}{4}} = \sqrt{4} = 2$
GY3	$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{a \cdot b}$	$\sqrt[4]{8} \cdot \sqrt[4]{x} = \sqrt[4]{8 \cdot x}$ $\sqrt[8]{2 \cdot 9} = \sqrt[8]{2} \cdot \sqrt[8]{9}$
GY4	$\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$	$\frac{\sqrt[3]{5}}{\sqrt[3]{4}} = \sqrt[3]{\frac{5}{4}}$ $\frac{\sqrt[7]{1}}{\sqrt[7]{x}} = \sqrt[7]{\frac{1}{x}}$
GY5	$\sqrt[n]{a} = a^{\frac{1}{n}}$	$\sqrt[5]{2} = 2^{\frac{1}{5}}$ $\sqrt[3]{x} = x^{\frac{1}{3}}$ $10^{\frac{1}{4}} = \sqrt[4]{10}$ $x^{\frac{1}{9}} = \sqrt[9]{x}$
GY6	$\sqrt[n]{a^m} = a^{\frac{m}{n}}$	$\sqrt[7]{2^2} = 2^{\frac{2}{7}}$ $\sqrt[3]{x^5} = x^{\frac{5}{3}}$ $3^{\frac{5}{4}} = \sqrt[4]{3^5}$ $x^{\frac{10}{7}} = \sqrt[7]{x^{10}}$
GY7	$\sqrt[n]{a^m} = (\sqrt[n]{a})^m$	$\sqrt[3]{8^6} = (\sqrt[3]{8})^6$
GY8	$\sqrt[n]{a} \cdot \sqrt[m]{a} = \sqrt[n \cdot m]{a^{n+m}}$	$\sqrt[2]{x} \cdot \sqrt[3]{x} = \sqrt[2 \cdot 3]{x^{2+3}} = \sqrt[6]{x^5}$
GY9	$\frac{\sqrt[n]{a}}{\sqrt[m]{a}} = \sqrt[n \cdot m]{a^{m-n}}$	$\frac{\sqrt[3]{x}}{\sqrt[7]{x}} = \sqrt[7 \cdot 3]{x^{7-3}} = \sqrt[21]{x^4}$