

# FORMULE

## ALGEBARSKI IZRAZI

$$\begin{aligned}(a \pm b)^2 &= a^2 \pm 2ab + b^2 \\(a \pm b)^3 &= a^3 \pm 3a^2b + 3ab^2 \pm b^3 \\a^2 - b^2 &= (a - b)(a + b) \\a^3 \pm b^3 &= (a \pm b)(a^2 \mp ab + b^2)\end{aligned}$$

## POTENCIJE

$$\begin{aligned}a^m \cdot a^n &= a^{m+n}, & a^m : a^n &= a^{m-n}, & (ab)^n &= a^n b^n, & (a : b)^n &= a^n : b^n \\(a^m)^n &= a^{m \cdot n}, & a^0 &= 1, & a^{-n} &= \frac{1}{a^n}\end{aligned}$$

## KORIJENI

$$\begin{aligned}\sqrt[n]{ab} &= \sqrt[n]{a} \cdot \sqrt[n]{b}, & \sqrt[n]{a : b} &= \sqrt[n]{a} : \sqrt[n]{b} \\a^{\frac{m}{n}} &= \sqrt[n]{a^m}, & \sqrt[n]{\sqrt[m]{a}} &= \sqrt[nm]{a}\end{aligned}$$

## KVADRATNA JEDNADŽBA

Kvadratna jednadžba oblika  $ax^2 + bx + c = 0$  ima rješenja oblika:  $x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ .

## KRIVULJE DRUGOG REDA

*KRUŽNICA* - opća jednadžba kružnice:  $(x - p)^2 + (y - q)^2 = r^2$ , gdje je točka  $S(p, q)$  središte kružnice, a  $r$  joj je polumjer/radijus.

*ELIPSA* - opća jednadžba elipse:  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ , gdje su  $a$  i  $b$  velika i mala polus elipse.

*HIPERBOLA* - opća jednadžba hiperbole:  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ , gdje su  $a$  i  $b$  velika i mala imaginarna polus hiperbole.

*PARABOLA* - opća jednadžba parabole:  $y^2 = 2px$ , gdje je  $p$  udaljenost žarišta od direktrise/ravnalice.

## EKSPONENCIJALNA I LOGARITAMSKA FUNKCIJA

$$\begin{aligned}a^x = b &\quad -> \quad x = \log_a b \\a^{\log_a x} &= x, \quad \log_a a^x = x\end{aligned}$$

## KOMPLEKSNI BROJEVI

Kompleksni brojevi su oblika  $z = x + yi$ , pri čemu je  $i = \sqrt{-1}$  imaginarna jedinica.

## TRIGONOMETRIJA

Osnovni identiteti:  $\sin^2 x + \cos^2 = 1$ ,  $\operatorname{tg} x = \frac{\sin x}{\cos x}$ ,  $\operatorname{ctg} x = \frac{\cos x}{\sin x}$ .

TABLICA vrijednosti trigonometrijskih funkcija																	
kut $\alpha$	$0\pi$ $0^\circ$	$\frac{\pi}{6}$ $30^\circ$	$\frac{\pi}{4}$ $45^\circ$	$\frac{\pi}{3}$ $60^\circ$	$\frac{\pi}{2}$ $90^\circ$	$\frac{2\pi}{3}$ $120^\circ$	$\frac{3\pi}{4}$ $135^\circ$	$\frac{5\pi}{6}$ $150^\circ$	$\frac{\pi}{180^\circ}$ $180^\circ$	$\frac{7\pi}{6}$ $210^\circ$	$\frac{5\pi}{4}$ $225^\circ$	$\frac{4\pi}{3}$ $240^\circ$	$\frac{3\pi}{2}$ $270^\circ$	$\frac{5\pi}{3}$ $300^\circ$	$\frac{7\pi}{4}$ $315^\circ$	$\frac{11\pi}{6}$ $330^\circ$	$\frac{2\pi}{360^\circ}$ $360^\circ$
$\sin \alpha$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0
$\cos \alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\operatorname{tg} \alpha$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	$\pm\infty$	$-\sqrt{3}$	-1	$-\frac{\sqrt{3}}{3}$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	$\pm\infty$	$-\sqrt{3}$	-1	$-\frac{\sqrt{3}}{3}$	0
$\operatorname{ctg} \alpha$	$\pm\infty$	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0	$-\frac{\sqrt{3}}{3}$	-1	$-\sqrt{3}$	$\pm\infty$	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0	$-\frac{\sqrt{3}}{3}$	-1	$-\sqrt{3}$	$\pm\infty$
	$-2\pi$ $-360^\circ$	$-\frac{11\pi}{6}$ $-330^\circ$	$-\frac{7\pi}{4}$ $-315^\circ$	$-\frac{5\pi}{3}$ $-300^\circ$	$-\frac{3\pi}{2}$ $-270^\circ$	$-\frac{4\pi}{3}$ $-240^\circ$	$-\frac{5\pi}{4}$ $-225^\circ$	$-\frac{7\pi}{6}$ $-210^\circ$	$-\pi$ $-180^\circ$	$-\frac{5\pi}{6}$ $-150^\circ$	$-\frac{3\pi}{4}$ $-135^\circ$	$-\frac{2\pi}{3}$ $-120^\circ$	$-\frac{\pi}{2}$ $-90^\circ$	$-\frac{\pi}{3}$ $-60^\circ$	$-\frac{\pi}{4}$ $-45^\circ$	$-\frac{\pi}{6}$ $-30^\circ$	$0\pi$ $0^\circ$

## LIMESI

Teoremi o limesima

1. Teorem o zbroju/razlici:  $\lim_{n \rightarrow \infty} (a_n \pm b_n) = \lim_{n \rightarrow \infty} a_n \pm \lim_{n \rightarrow \infty} b_n$
2. Teorem o umnošku:  $\lim_{n \rightarrow \infty} (a_n \cdot b_n) = \lim_{n \rightarrow \infty} a_n \cdot \lim_{n \rightarrow \infty} b_n$
3. Teorem o kvocijentu:  $\lim_{n \rightarrow \infty} \frac{a_n}{b_n} = \frac{\lim_{n \rightarrow \infty} a_n}{\lim_{n \rightarrow \infty} b_n}$
4. Teorem o potenciji:  $\lim_{n \rightarrow \infty} a_n^{b_n} = \left( \lim_{n \rightarrow \infty} a_n \right)^{\lim_{n \rightarrow \infty} b_n}$
5. Teorem o monotonoosti: ako je  $(a_n) \leq (b_n)$ , onda su i  $\lim_{n \rightarrow \infty} a_n \leq \lim_{n \rightarrow \infty} b_n$

Neki značajniji limesi:

1.  $\lim_{n \rightarrow \infty} \frac{1}{n} = 0, \quad \lim_{n \rightarrow \infty} \frac{1}{n^k} = 0$
2.  $\lim_{n \rightarrow \infty} c = c, \quad \lim_{n \rightarrow \infty} (c \cdot a_n) = c \lim_{n \rightarrow \infty} a_n$
3.  $\lim_{n \rightarrow \infty} \sqrt[n]{a} = 1, \quad a > 0$
4.  $\lim_{n \rightarrow \infty} q^n = 0, \quad -1 < q < 1$
5.  $\lim_{n \rightarrow \infty} \frac{n^p}{a^n} = 0, \quad \lim_{n \rightarrow \infty} \frac{\log_a n}{n^p} = 0, \quad a > 1, p > 0$
6.  $\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n = e, \quad \lim_{x_n \rightarrow \infty} \left(1 + \frac{1}{x_n}\right)^{x_n} = e, \quad \lim_{x_n \rightarrow \infty} \left(1 + \frac{k}{x_n}\right)^{x_n} = e^k$