

Zadatak 2. Za zadanu funkciju f izračunaj limes u točki a :

$$1) f(x) = \frac{x^2 - 1}{x + 2}, a = 2;$$

$$2) f(x) = \frac{x^2 - 9}{x + 3}, a = -3;$$

$$3) f(x) = \frac{x^2 - 25}{x - 5}, a = 5;$$

$$4) f(x) = x - \frac{x^2 - 4}{x - 2}, a = 2;$$

$$5) f(x) = \frac{x^2 - 5x + 6}{x - 2}, a = 2;$$

$$6) f(x) = \frac{3x^2 - 17x + 20}{6x^2 - 7x - 5}, a = \frac{5}{3};$$

$$7) f(x) = \frac{x^3 - 3x^2 - 4x + 12}{x - 3}, a = 3;$$

$$8) f(x) = \frac{x^3 - 3x^2 - 4x + 12}{x^2 - 5x + 6}, a = 3.$$

Rješenje.

$$1) \lim_{x \rightarrow 2} \frac{x^2 - 1}{x + 2} = \frac{3}{4},$$

$$2) \lim_{x \rightarrow -3} \frac{x^2 - 9}{x + 3} = \lim_{x \rightarrow -3} \frac{(x - 3)(x + 3)}{x + 3} = \lim_{x \rightarrow -3} (x - 3) = -6,$$

$$3) \lim_{x \rightarrow 5} \frac{x^2 - 25}{x - 5} = \lim_{x \rightarrow 5} \frac{(x - 5)(x + 5)}{x - 5} = \lim_{x \rightarrow 5} (x + 5) = 10,$$

$$4) \lim_{x \rightarrow 2} \left(x - \frac{x^2 - 4}{x - 2} \right) = \lim_{x \rightarrow 2} (x - x - 2) = -2,$$

$$5) \lim_{x \rightarrow 2} \frac{x^2 - 5x + 6}{x - 2} = \lim_{x \rightarrow 2} \frac{(x - 2)(x - 3)}{x - 2} = -1,$$

$$6) \lim_{x \rightarrow \frac{5}{3}} \frac{3x^2 - 17x + 20}{6x^2 - 7x - 5} = \lim_{x \rightarrow \frac{5}{3}} \frac{3x^2 - 12x - 5x + 20}{6x^2 - 10x + 3x - 5} = \lim_{x \rightarrow \frac{5}{3}} \frac{(3x - 5)(x - 4)}{(2x + 1)(3x - 5)}$$

$$= \lim_{x \rightarrow \frac{5}{3}} \frac{x - 4}{2x + 1} = \frac{\frac{5}{3} - 4}{2 \cdot \frac{5}{3} + 1} = \frac{-\frac{7}{3}}{\frac{13}{3}} = -\frac{7}{13},$$

$$7) \lim_{x \rightarrow 3} \frac{x^3 - 3x^2 - 4x + 12}{x - 3} = \lim_{x \rightarrow 3} \frac{x^2(x - 3) - 4(x - 3)}{x - 3} = \lim_{x \rightarrow 3} \frac{(x - 3)(x^2 - 4)}{x - 3} = 5,$$

$$8) \lim_{x \rightarrow 3} \frac{x^3 - 3x^2 - 4x + 12}{x^2 - 5x + 6} = \lim_{x \rightarrow 3} \frac{(x - 3)(x - 2)(x + 2)}{(x - 2)(x - 3)} = 5.$$