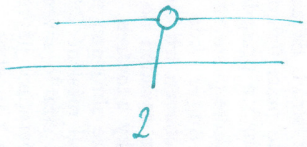
ASYMPTOTA

$$f(x) = \frac{x^3 - 3x^2}{(2-x)^2}$$

I) Definiční obor

$2 - x \neq 0$

$x \neq 2$



$x \in (-\infty; 2) \cup (2; \infty)$

II) $\lim\limits_{x \to 2} \frac{x^3 - 3x^2}{(2-x)^2} = -\infty$

$x = 2$ je rovná asymp.

III) Šikmá asymptota

$$k_{1,2} = \lim_{x \to \pm\infty} \frac{x^3 - 3x^2}{(2-x)^2 \cdot x} = \lim_{x \to \pm\infty} \frac{x^3 - 3x^2}{(4 - 4x + x^2)x} = \lim_{x \to \pm\infty} \frac{x^3 - 3x^2}{4x - 4x^2 + x^3} =$$

$$= \lim_{x \to \pm\infty} \frac{3x^2 - 6x}{4 - 8x + 3x^2} = \lim_{x \to \pm\infty} \frac{6x - 3}{-8 + 6x} = \lim_{x \to \pm\infty} \frac{6}{6} = 1$$

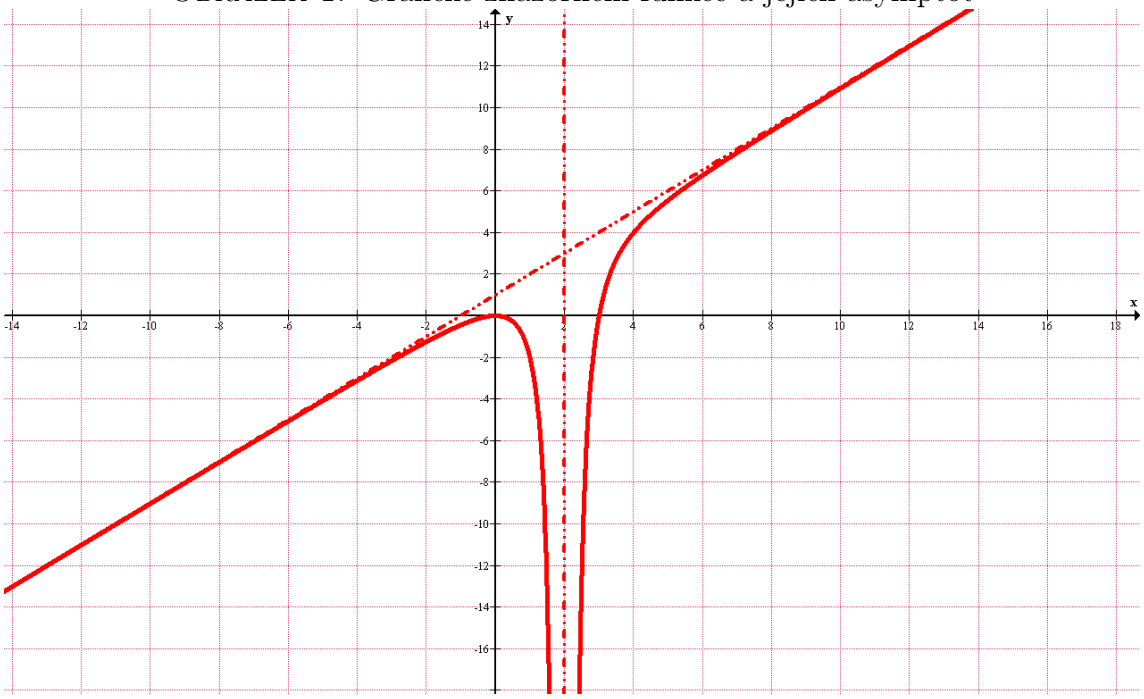
IV) $q_{1,2} = \lim\limits_{x \to \pm\infty} \frac{x^3 - 3x^2}{(2-x)^2} - x = \lim\limits_{x \to \pm\infty} \frac{x^3 - 3x^2 - x(2-x)^2}{4 - 4x + x^2} =$

$$= \lim_{x \to \pm\infty} \frac{x^3 - 3x^2 - 4x + 4x^2 - x^3}{4 - 4x + x^2} = \lim_{x \to \pm\infty} \frac{x^2 - 4x}{4 - 4x + x^2} =$$

$$= \lim_{x \to \pm\infty} \frac{2x - 4}{-4 + 2x} = \lim_{x \to \pm\infty} \frac{2}{2} = 1$$

V) šikmá asymptota $y = x + 1$

Obrázek 1. Grafické znázornění funkce a jejích asymptot



Zdroj: program Graph