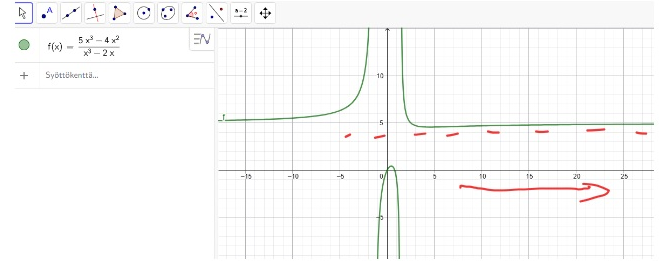


Raja-arvo äärettömyydessä

$$\text{Esim. } \lim_{x \rightarrow \infty} \frac{5x^3 - 2x^2}{x^3 - 4x} = \lim_{x \rightarrow \infty} \frac{x^3 \left(5 - \frac{2}{x}\right)}{x^3 \left(1 - \frac{4}{x^2}\right)} = \frac{5}{1} = 5$$



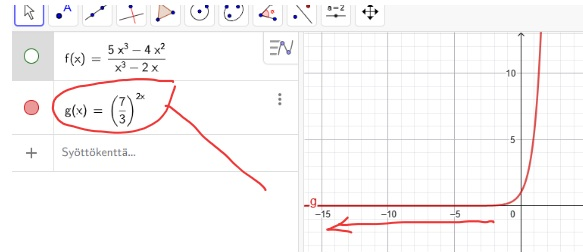
8.6 Määritä raja-arvo.

~~CAS~~

a) $\lim_{x \rightarrow \infty} \frac{1}{7^x}$

b) $\lim_{x \rightarrow -\infty} \left(\frac{7}{3}\right)^{2x} = \frac{1}{\left(\frac{7}{3}\right)^{\infty}} = \frac{1}{\infty} = 0$

a) $\lim_{x \rightarrow \infty} \frac{1}{7^x} = \frac{1}{\infty} = 0$



8.4

Määritä raja-arvo.

CAS

a) $\lim_{x \rightarrow -\infty} (9x - x^5)$

b) $\lim_{x \rightarrow -\infty} \frac{6x+1}{\sqrt{9x^2+7}}$

$$b) \lim_{x \rightarrow -\infty} \frac{6x+1}{\sqrt{9x^2+7}} = \lim_{x \rightarrow -\infty} \frac{3x(2+\frac{1}{3x})}{\underbrace{\sqrt{9x^2}}_{=3x} \sqrt{1+\frac{7}{9x^2}}} = \lim_{x \rightarrow -\infty} \frac{3x(2+\frac{1}{3x})}{-3x \sqrt{1+\frac{7}{9x^2}}}$$

$\rightarrow 0$

$$\text{TÄÄ} \quad \lim_{x \rightarrow -\infty} \frac{6x+1}{\sqrt{9x^2+7}} = \lim_{x \rightarrow -\infty} \frac{x(6+\frac{1}{x})}{|x| \sqrt{9+\frac{7}{x^2}}} = \lim_{x \rightarrow -\infty} \frac{x \cdot 6}{-x \cdot 3} = \frac{6}{-3} = -2$$

$\rightarrow 0$

