13.31

torsdag 22 december 2022 17:01

a)

$$\underbrace{\frac{1}{\sqrt{x^3+1}}}_{f(x)} \le \underbrace{\frac{1}{\sqrt{x^3}}}_{g(x)} = \frac{1}{x^{3/2}}$$

$1/\sqrt{9} < 1/\sqrt{8}$

$g(x)$ konv. $\Rightarrow f(x)$ konv.

$f(x)$ div. $\Rightarrow g(x)$ div.

$$\int_2^\infty x^{-3/2}\,dx = \left[\frac{x^{-1/2}}{-1/2}\right]_2^\infty = \left[-2x^{-1/2}\right]_2^\infty = -2\cdot\frac{1}{\sqrt{\infty}} - \left(-2\cdot\frac{1}{\sqrt{2}}\right) = \sqrt{2} = \text{konvergent}$$

$\frac{1}{\sqrt{\infty}} \to 0$

Sv: $\int_2^\infty \frac{1}{\sqrt{x^3+1}}\,dx = \text{konvergent}$

b)

$$\underbrace{\frac{1}{\sqrt{x-1}}}_{g(x)} \ge \underbrace{\frac{1}{\sqrt{x}}}_{f(x)}$$

$\frac{1}{\sqrt{2-1}} > \frac{1}{\sqrt{2}}$

$g(x)$ konv. $\Rightarrow f(x)$ konv.

$f(x)$ div. $\Rightarrow g(x)$ div.

$$\int_2^\infty \frac{1}{\sqrt{x}}\,dx = \left[2\sqrt{x}\right]_2^\infty = 2\infty - 2\sqrt{2} = \text{divergent}$$

Sv: divergent