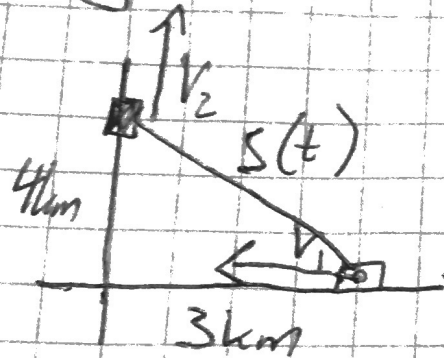


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Innlevering 2

Oppgave 1)



$$v_1 = 80 \text{ km/t}$$

$$v_2 = 50 \text{ km/t}$$

$$s(t) = \sqrt{(3 - 80t)^2 + (4 + 50t)^2}$$

$$s(t) = \sqrt{8900t^2 - 80t + 25}$$

$$v(t) = s'(t) = (17800t - 80) \cdot \frac{1}{2} (8900t^2 - 80t + 25)^{-\frac{1}{2}}$$

$$v(0) = -8$$

ved $t = 0$ øker ~~av~~ avstanden mellom kjøretøye
med 8 km/t

Oppgave 2)

$$\sum_{i=1}^n \frac{1}{n(z + \frac{i}{n}) \ln(z + \frac{i}{n})} = \frac{1}{n} \sum_{i=1}^n f(x_i)$$

Hver $f(x) = \frac{1}{(z+x) \ln(z+x)}$

$$\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{i=1}^n f(x_i) = \int_0^1 f(x) dx = \int_z^3 \frac{1}{u \ln u} du = \ln\left(\frac{\ln(3)}{\ln(2)}\right)$$

Oppgave 3)

$$\int_2^{\infty} \frac{x^2+9}{x^2+3x^2-4} dx = \int_2^{\infty} \frac{x^2+9}{(x^2+4)(x^2-1)}$$

$$\frac{x^2+9}{(x^2+4)(x^2-1)} = \frac{Ax+B}{x^2+4} + \frac{C}{x^2-1}$$

$$x^2+9 = Ax^3 - Ax + Bx^2 - B + Cx^2 + 4C$$

I $A=0$

II $B+C=1$

III $4C-B=9$

$$B=1-C$$

$$5C=10$$

$$\underline{B=-1}$$

$$\underline{C=2}$$

$$\frac{2}{x^2-1} = \frac{A}{x+1} + \frac{B}{x-1} = -\frac{1}{x+1} + \frac{1}{x-1}$$

$$2 = Ax - A + Bx + B$$

$$A+B=0 \quad B-A=2$$

$$\underline{B=-A}$$

$$-2A=2$$

$$\underline{B=1}$$

$$\underline{A=-1}$$

$$\underline{B = -A}$$

$$\underline{B = 1}$$

$$-2A = 2$$

$$\underline{A = -1}$$

$$\int_2^{\infty} \frac{x^2 + 9}{x^4 + 3x^2 - 4} dx = \int_2^{\infty} \frac{-1}{x^2 + 4} - \frac{1}{x+1} + \frac{1}{x-1} dx$$

$$= \left[-\frac{1}{2} \arctan\left(\frac{1}{2}x\right) + \ln\left(\frac{x-1}{x+1}\right) \right]_2^{\infty}$$

$$= -\frac{1}{2} \cdot \frac{\pi}{2} - \left(-\frac{1}{2} \cdot \frac{\pi}{4} + \ln(3) \right)$$

$$= \ln(3) - \frac{\pi}{8}$$

$$= -\frac{1}{2} \cdot \frac{\pi}{2} - \left(-\frac{1}{2} \cdot \frac{\pi}{4} + \ln\left(\frac{1}{3}\right) \right)$$

$$= \ln(3) - \frac{\pi}{8}$$

Oppgave 4)

$$y = \frac{2}{3} x^{\frac{3}{2}} \quad x \in [1, 0]$$

$$S = \int_0^1 \sqrt{1 + (f'(x))^2} dx$$

$$y'(x) = \sqrt{x}$$

$$S = \int_0^1 \sqrt{1+x} dx = \int_1^2 \sqrt{u} du = \left[\frac{2}{3} u^{\frac{3}{2}} \right]_1^2$$

$$S = \frac{2}{3} (2\sqrt{2} - 1)$$
