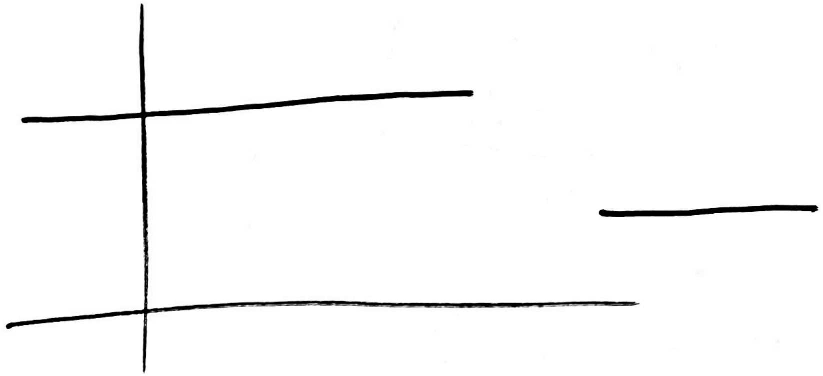
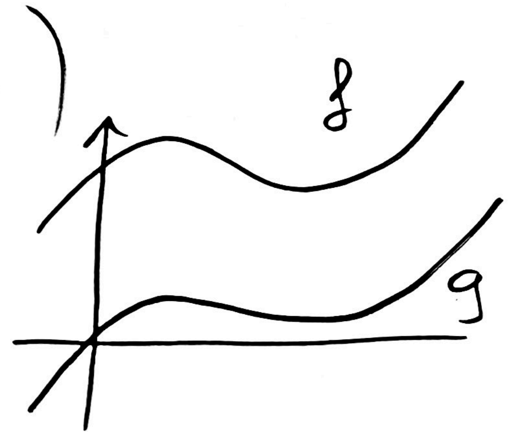
11 jan 2022

Øving

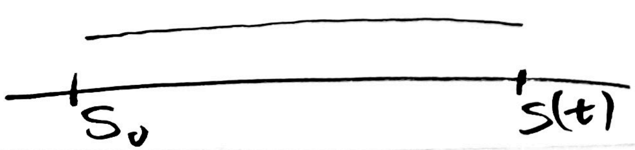
Hvis $f'(x) = 0$ alle x,
da må $f(x)$ være konstant
i hvert intervall i definisjonsmengden til $f(x)$

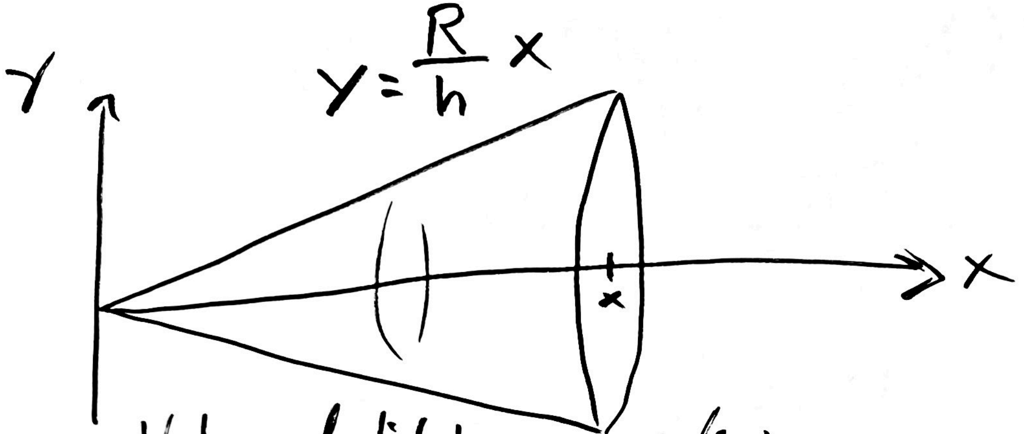


Hvis $f'(x) = g'(x)$ $\left(\Leftrightarrow (f-g)'(x) = 0 \right)$
da må $f(x) = g(x) + \underbrace{C}_{\text{konstant}}$

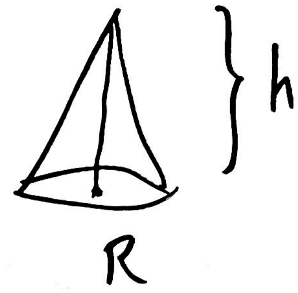


Fysisk: Kjenner vi $V(t)$ fart. så er posisjon $S(t)$ bestemt opp til en konstant.





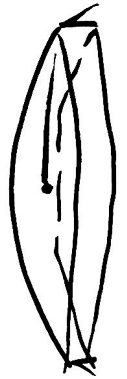
Volumet til kjegle $V(x)$



$V = \frac{1}{3}\pi R^2 \cdot h$

Skal vise formelen

$V(0) = 0$



radius $\frac{R}{h}x$

Hva er $V'(x)$?

$\Delta V \cong \Delta x \cdot \pi \left(\frac{R}{h}\right)^2 x^2$

Δx

$$V'(x) = \lim_{\Delta x \to 0} \frac{\Delta V}{\Delta x} = \pi\left(\frac{R^2}{h^2}\right) \cdot x^2$$

siden

$(x^3)' = 3x^2$

$\left(\frac{1}{3}x^3\right)' = x^2$

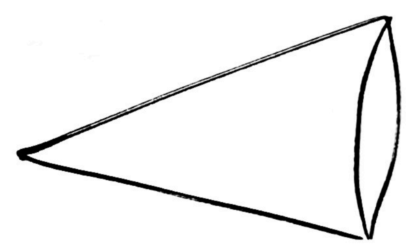
$\left(\pi \frac{R^2}{h^2} \cdot \frac{1}{3}x^3\right)' = \pi \frac{R^2}{h^2} x^2$

Siden $V'(x) = \left(\frac{\pi R^2}{h^2} \cdot \frac{1}{3} x^3\right)'$

så er $V(x) = \frac{\pi R^2}{3h^2} x^3 + C$

siden $V(0) = 0$ så er $C = V(0) = 0$.

$V(x) = \frac{\pi R^2}{3h^2} x^3$.



$\frac{R}{h} \cdot h = R$

$x = h$

Volumet til en kjegle med høyde h og radius R er lik $V(h) = \frac{\pi R^2}{3h^2} h^3$

$= \underline{\frac{1}{3}(\pi R^2) h}$

vi har vist formelen for volumet til en kjegle.

Oppg. $(4x^{12})' = 4(x^{12})' = 4(12x^{11}) = 48x^{11}$

$$\left(-x^7 + \sqrt{3}\,x^5 - 7x + \sqrt{31}\right)'$$
$$= (-1)(x^7)' + \sqrt{3}(x^5)' - 7(x)' + (\sqrt{31})'$$
$$= -1 \cdot 7x^6 + \sqrt{3} \cdot 5x^4 - 7 \cdot 1 + 0$$
$$= \underline{-7x^6 + 5\sqrt{3}\,x^4 - 7}.$$

$f(x) = x^5 - 4x^3 - x^2 + 4x + 1.$

Deriver $f(x)$

Finn tangentlinjen ; $(a, f(a))$ og tegn opp
(normallinjen) i Geogebra.

La a være variabel parameter
"slide"

$$f'(x) = (x^5)' - 4(x^3)' - 1(x^2)' + 4(x)' + (1)'$$

$$= 5x^4 - 4 \cdot 3x^2 - 1 \cdot 2x + 4 \cdot 1 + 0$$

$$f'(x) = 5x^4 - 12x^2 - 2x + 4$$

Tangentlinjen $x = a$

Tegner i geogebra

$$y = f'(a)(x-a) + f(a).$$

Normal linjen $y = \frac{-1}{f'(a)}(x-a) + f(a)$