

$$A'(x) = (-\sin x) \cdot \sin x + (\cos x + 1) \cdot \cos x$$

$$= -\sin^2 x + \cos^2 x + \cos x = 0$$

$$\Leftrightarrow -(1 - \cos^2 x) + \cos^2 x + \cos x = 0$$

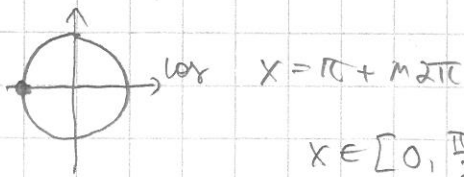
$$\Leftrightarrow 2\cos^2 x + \cos x - 1 = 0$$

$$\text{adm. } t = \cos x: 2t^2 + t - 1 = 0 \quad \Leftrightarrow t = \begin{cases} -1 \\ \frac{1}{2} \end{cases}$$

$$\cos x = -1$$

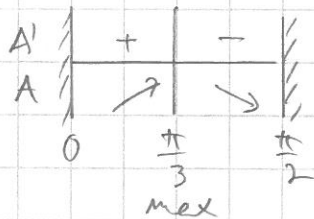
$$\text{tai } \cos x = \frac{1}{2} = \cos \frac{\pi}{3}$$

$$\Leftrightarrow x = \pm \frac{\pi}{3} + m2\pi$$



$$\cos x = -1 \Rightarrow x = \pi + m2\pi$$

$$x \in [0, \frac{\pi}{2}] : \frac{\pi}{3}$$

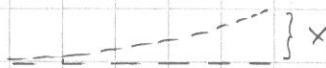


$$A'(\frac{\pi}{6}) = 1,4 > 0, \quad A'(\frac{\pi}{2}) = -0,5 < 0$$

suurin piste -ale:

$$A(\frac{\pi}{3}) = (\cos \frac{\pi}{3} + 1) \cdot \sin \frac{\pi}{3} = (\frac{1}{2} + 1) \cdot \frac{\sqrt{3}}{2} = \frac{3}{2} \cdot \frac{\sqrt{3}}{2} = \frac{3\sqrt{3}}{4}$$

$$20.10 \quad x(t) = A \sin(2\pi f t)$$



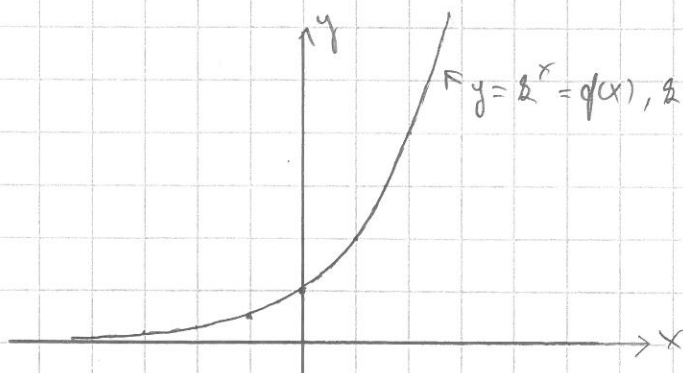
$$A = 0,30 \text{ mm}$$

$$f = 440 \text{ Hz} = 440 \frac{1}{\text{s}}$$

Hopearo on paiton muutospere eli deriivette:

$$v(t) = x'(t) = A \cos(2\pi f t) \cdot 2\pi f$$

21. Eksponenttifunktion deriivette



$$y = 2^x = f(x), x > 1$$

f aidosti kasvava $\mathbb{R} : \mathbb{R}^+$
 x kasvava $\rightarrow f'(x)$ kasvava

Om oleassa $b \in]2, 3[$:

$$f'(x) = f(x) \text{ aina}$$

Hoeparin luku : $e = 2,718... \notin \mathbb{Q}$
 e ei ole ratiionaliluku (muutoluku
 vaan iratiionaliluku (vert. $\pi, \sqrt{2}, \dots$)

$$\boxed{D e^x = e^x}$$

merk.

$$\boxed{\log_e x = \ln x}$$

LUONNOLLINEN LOGARITMI