

16.19 Määritä funktion $f(x) = \sqrt{\frac{9}{1-x^2}}$ määrittelyjoukko ja derivaattafunktion nollakohdat.

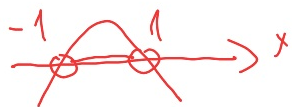
Mj. $\underbrace{1-x^2}_{>0} > 0$

nollakohtat:

$$1-x^2=0$$

$$x^2=1 \quad ||\sqrt{}$$

$$x = \pm 1$$



$$-1 < x < 1$$

$$f(x) = \frac{\sqrt{9}}{\sqrt{1-x^2}} = \frac{3}{\sqrt{1-x^2}} = 3(1-x^2)^{-\frac{1}{2}}$$

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

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

$$f'(x) = 0, \text{ kun } 3x = 0 \\ \underline{\underline{x = 0}}$$

17.2 Määritä derivaattaa käyttäen funktion

a) $\frac{1}{\sqrt{1-x^4}}$

b) $\sqrt{4x-1} - x = f(x) = (4x-1)^{\frac{1}{2}} - x$

ääriarvot.

lu) Mj. $4x-1 \geq 0$

$4x \geq 1$

$x \geq \frac{1}{4}$

$f'(x) = 0$, kun $2 - \sqrt{4x-1} = 0$

$2 = \sqrt{4x-1} \quad || (\)^2$

$4 = 4x - 1$

$5 = 4x$

$x = \frac{5}{4}$

$f'(x) = \frac{1}{2}(4x-1)^{-\frac{1}{2}} - 1 = \frac{1}{2\sqrt{4x-1}} - 1$

$= \frac{2 - \sqrt{4x-1}}{\sqrt{4x-1}}$

$f'(1) = \frac{2 - \sqrt{3}}{\sqrt{3}} > 0$

$f'(2) = \frac{2 - \sqrt{7}}{\sqrt{7}} < 0$

Julkukaario

	$\frac{1}{4}$	$\frac{5}{4}$	
$f'(x)$	+	-	
$f(x)$			

↑ maks. kohta

Paikallinen maksimiarvo

$f\left(\frac{5}{4}\right) = \sqrt{4 \cdot \frac{5}{4} - 1} - \frac{5}{4} = \frac{3}{4}$

Define $f(x) = \sqrt{4x-1} - x$

$f'(x) = 0$

done

$$\frac{d}{dx}(f(x))$$

$$\frac{-(\sqrt{4x-1}-2)}{\sqrt{4x-1}} = f'(x)$$

$$\text{solve} \left(\frac{d}{dx}(f(x)) = 0 \right)$$

$$f'(x) = 0, \text{ kem}$$

$$\left\{ x = \frac{5}{4} \right\}$$

$$\frac{-(\sqrt{4x-1}-2)}{\sqrt{4x-1}} \Big|_{x=1}$$

$$\frac{-(\sqrt{4x-1}-2)}{\sqrt{4x-1}} \Big|_{x=2}$$

$$f\left(\frac{5}{4}\right)$$

0.1547005384

-0.244071054

$\frac{3}{4}$

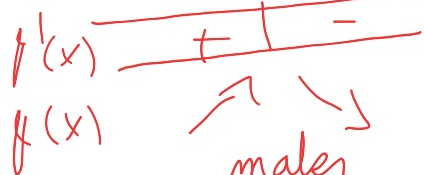
$f'(x) = 0$
mulki

dobkali

maksimi arsu

bulunka arsu :

$\frac{3}{4}$



maksimi arsu