

1

$f(x) := \cos(2 \cdot x) \qquad x0 := 0.5$

$\lim_{x \rightarrow x0} f(x) \rightarrow 0.5403023058681397174$

$\frac{d}{dx} f(x) \rightarrow -2 \cdot \sin(2 \cdot x)$

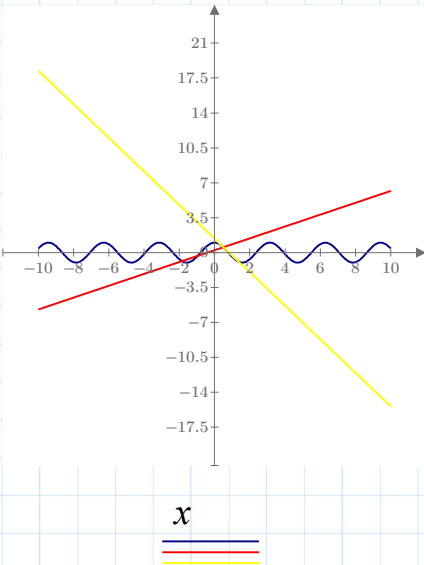
$\frac{d^2}{dx^2} f(x) \rightarrow -4 \cdot \cos(2 \cdot x)$

$\frac{d}{dx0} f(x0) \rightarrow -1.6829419696157930133$
 $\frac{d^2}{dx0^2} f(x0) \rightarrow -2.1612092234725588696$

$k := \frac{d}{dx0} f(x0) = -1.683$

$yk(x) := k \cdot (x - x0) + f(x0)$

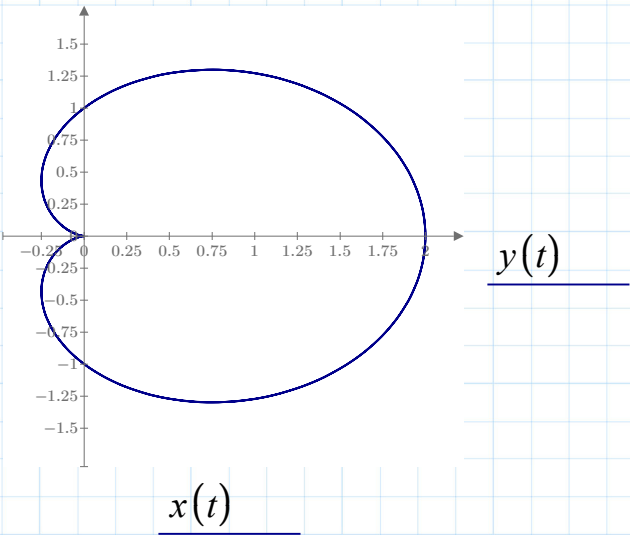
$yn(x) := \frac{-1}{k} \cdot (x - x0) + f(x0)$



$f(x)$
 $yn(x)$
 $yk(x)$

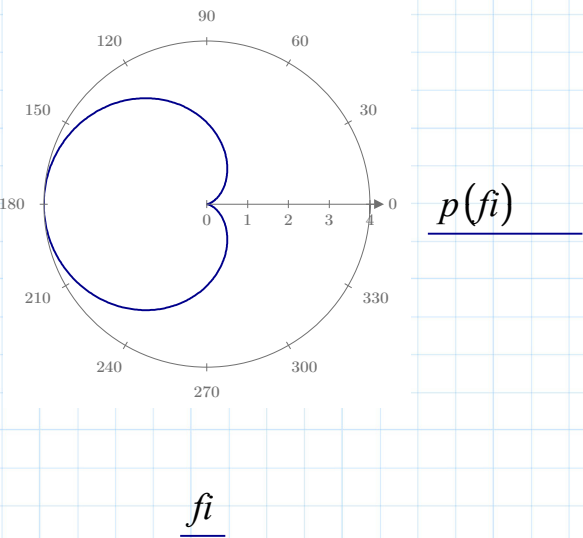
2

$x(t) := \cos(t)^2 + \cos(t) \quad y(t) := \cos(t) \sin(t) + \sin(t)$



3

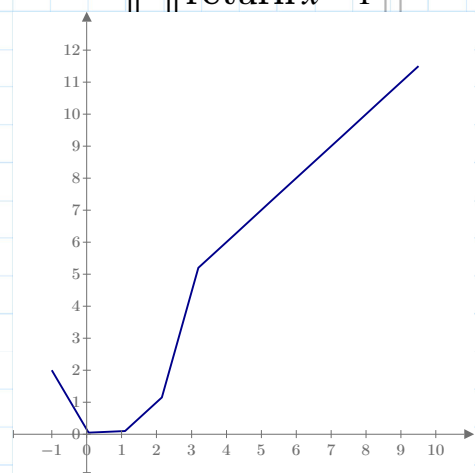
$p(fi) := 2 \left(1 - \cos(fi) \right)$



4

$$x := -1, .05..10$$

$$f(x) := \begin{cases} \text{if } x \leq 0 \\ \quad \text{return } 2 x^2 \\ \text{else if } 0 < x \leq 1 \\ \quad \text{return } x \\ \text{else if } x > \pi \\ \quad \text{return } x + 2 \\ \text{else} \\ \quad \text{return } x - 1 \end{cases}$$



$f(x)$

x

5

clear(x)

$$f(x) := \frac{1}{6 x^3 - 7^2 - 3 x} \quad a := 3 \quad b := 15$$

$$f(x) \xrightarrow{\text{parfrac}} -\frac{1}{3 \cdot x - 6 \cdot x^3 + 49}$$

$$\int_a^b f(x) dx = 0.011$$

6

$$f(x) := \frac{x^3}{x^2 - x + 1}$$

$$1 \quad x^2 - x + 1 \neq 0 \quad x^2 - x + 1 \xrightarrow{\text{solve}} \begin{bmatrix} \frac{1}{2} + \frac{\sqrt{3} \cdot 1i}{2} \\ \frac{1}{2} - \frac{\sqrt{3} \cdot 1i}{2} \end{bmatrix}$$

$$2 \quad \lim_{x \rightarrow \frac{1}{2} + \frac{\sqrt{3} \cdot 1i}{2}} f(x) \rightarrow (-1i) \cdot \infty \quad \lim_{x \rightarrow \frac{1}{2} + \frac{\sqrt{3} \cdot 1i}{2}} f(x) \rightarrow 1i \cdot \infty$$

$$\lim_{x \rightarrow \frac{1}{2} - \frac{\sqrt{3} \cdot 1i}{2}} f(x) \rightarrow \text{undefined} \quad \lim_{x \rightarrow \frac{1}{2} - \frac{\sqrt{3} \cdot 1i}{2}} f(x) \rightarrow \text{undefined}$$

$$k := \lim_{x \rightarrow \infty} \frac{x^3}{(x^2 - x + 1) \cdot x} \rightarrow 1$$

$$b := \lim_{x \rightarrow \infty} \frac{x^3}{(x^2 - x + 1)} - x \rightarrow \infty - x$$

$$3 \quad \frac{x^3}{x^2 - x + 1} \xrightarrow{\text{solve}, x} 0$$

$$f(0) = 0$$

$$4 \quad \frac{-x^3}{x^2 + x + 1}$$

четная

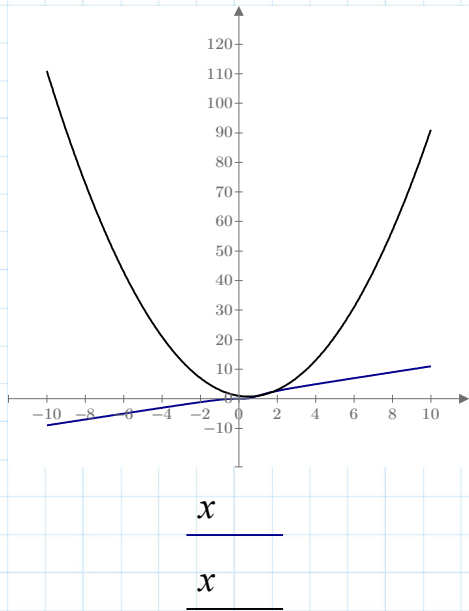
$$5 \quad \frac{d}{dx} f(x) \rightarrow \frac{3 \cdot x^2}{x^2 - x + 1} - \frac{x^3 \cdot (2 \cdot x - 1)}{(x^2 - x + 1)^2} \xrightarrow{\text{simplify}} \frac{2 \cdot x - 1}{(x^2 - x + 1)^2} + 1$$

$$6 \quad \frac{d^2}{dx^2} f(x) \rightarrow \frac{6 \cdot x}{x^2 - x + 1} - \frac{2 \cdot x^3}{(x^2 - x + 1)^2} + \frac{2 \cdot x^3 \cdot (2 \cdot x - 1)^2}{(x^2 - x + 1)^3} - \frac{6 \cdot x^2 \cdot (2 \cdot x - 1)}{(x^2 - x + 1)^2} \xrightarrow{\text{simpl}} \dots$$

$$- \frac{6 \cdot x \cdot (x - 1)}{(x^2 - x + 1)^3} \xrightarrow{\text{solve}, x} \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

7

$f(x) := \frac{x^3}{x^2 - x + 1}$
 $fl(x) := x^2 - x + 1$



$f(x)$

$fl(x)$