Distance between them

\[ f(\text{one place}) - f(\text{another place}) \]

\[
\frac{x - 1}{(x)f' - (x)f(x)} \xrightarrow{x \to 1} \frac{x}{x} = \lim_{x \to 1} f(x) = f(1)
\]

\[
\frac{0}{(x)f' - (x)f(x)} \xrightarrow{x \to 0} \frac{0}{0}\]

DIVERGES

\[
\lim_{x \to 0} f(x) = f(0) = 0
\]

SUMMARY
1. Mathematical definitions and principles.

2. Physical concepts and measurements.

3. (Equation or concept)
Fundamental Definition

Compute derivative of h(x)

Using Chain Rule

Compute derivative of f(x) + g(x) to get h(x)

Can we use derivatives of products, quotients, and compositions of functions, or do we need building rules? If h(x) is a

The individual functions.

To use algebraic properties, you need to compute derivative of h(x)
\[
\frac{d}{dx} \left( \frac{x^{1/2}}{x^2} \right) = \text{FACT: } \frac{x^n}{x^m} = x^{n-m}
\]

Explanation:

\[
\frac{d}{dx} \left( \frac{1}{x^{1/2}} \right)
\]
\[
\frac{2^n}{x} = \frac{x}{n^{x-1}} \quad \frac{2^n}{x} / (x, B - \varepsilon) = \frac{y \cdot x \cdot (y+x)}{n \cdot (y+x) - x} = \frac{y}{(x^2 + y - (y+x))^T} = \frac{y}{(x + y)^T - \frac{1}{y} \cdot \frac{x}{y}}
\]

\[
\begin{cases}
-1 & x \leq (y, B)
\end{cases}
\]

What about \( x \neq (x, B) \)?
\[
\begin{align*}
\frac{y}{(x+y)^2} - \frac{1}{(x+y)} &= \frac{y}{x+y} \\
\Rightarrow \quad \lim_{x \to 0} \frac{y}{(x+y)^2} &= \lim_{x \to 0} \frac{y}{x+y} \\
&= \frac{0}{(0+0)^2} = \frac{0}{0} \\
\end{align*}
\]

Abstract version:

Tell the same?
so \( g'(x) = \lim_{h \to 0} \left[ \frac{f(x+h)-f(x)}{h} \right] \cdot \frac{1}{f(x+h) f(x)} \)

\[
= -\frac{f'(x)}{(f(x))^2} \quad \text{unless} \quad f(x) = 0
\]
It's more linear.

You can compute \( g(x) \) directly, but

\[
\frac{f(x)}{1} = \frac{x^2 + 1}{1} = (x^2 + 1)
\]

so

\[
\int \frac{dx}{x^2 + 1} = x + C
\]

Ex: \( \int \frac{dx}{x^2 + 1} = x + \arctan(x) \) where \( f(x) = 2x \).
"SIDE BAR"

\[ g(x) = \frac{1}{x^2+1} \]
\[ g'(x) = \lim_{h \to 0} \frac{g(x+h) - g(x)}{h} \]
\[ = \frac{1}{(x+h)^2+1} - \frac{1}{x^2+1} \]
\[ = \frac{(x^2+1) - ((x+h)^2+1)}{h(x^2+1)((x+h)^2+1)} \]
\[ = \frac{-2xh + h^2}{h(x^2+1)((x+h)^2+1)} \]
\[ = -2x + h \]
\[ \frac{h}{(x^2+1)((x+h)^2+1)} \]
\[ \rightarrow -\frac{2x}{(x^2+1)^2} \]
\[
\frac{\frac{2}{\sqrt{1-x^2}}}{\frac{2}{\sqrt{1-y^2}}} = \frac{\frac{\sqrt{x}}{1}}{\frac{\sqrt{y}}{1}} = \frac{\frac{\sqrt{x}}{\sqrt{y}}}{\sqrt{1}} = \frac{x}{y} \quad (x, y > 0)
\]
Specific
\[
\lim_{h \to 0} \frac{f(a+h) - f(a)}{h} = f'(a)
\]

**Proof of (1)**

**Constants**

\[
\alpha \in \mathbb{R} \quad \Rightarrow \quad \alpha \cdot (x, f(x)) = (\alpha x, f(x))
\]

\[
(x, b) + (x, f(x)) = ((x, b) + (x, f(x)))
\]

**Facts:**
\[
\lim_{h \to 0} \frac{f(x+h) - f(x)}{h} = \left[ \frac{f(x)B + (-g(x))B}{B} \right]
\]
Tangent line with a slope of -1 at the y-intercept.

Find a function $y = ax^2 + bx + c$ whose graph has an x-intercept of 1, a y-intercept of -2, and a
Find the x-coordinate of the point on the graph of \( y = \sqrt{x} \) where the tangent line is parallel to the secant line that cuts the curve at \( x = 3 \) and \( x = 4 \).
Show that the segment of the tangent line to the graph of \( \frac{x}{y} = 1 \) that is cut off by the coordinate axes is bisected by the point of tangency.
Consider the size of \( \frac{dP}{dL} \) in the interval \( 0 \leq L \leq 700 \). Why is the temperature most sensitive and least sensitive to temperature changes?

Where \( T \) is the temperature in degrees Celsius. Where in the interval from 0°C to 700°C is the

\[
R = 10 + 0.04124T - 1.79 \times 10^{-5}T^2
\]

Platinum resistance thermometers are given by

In the temperature range between 0°C and 700°C, the resistance \( R \) [in ohms] of a certain